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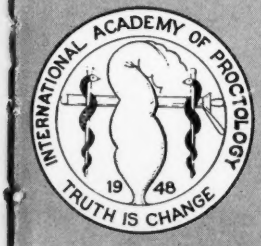

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THE AMERICAN JOURNAL OF
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A quarterly journal of Proctology and Allied Subjects

VOLUME 1 MARCH, 1950 NUMBER 1

DUODENOCOLIC FISTULA*†

(REPORT OF FIVE CASES)

EARL J. HALLIGAN, M.D.
LOUIS L. PERKEL, M.D.
and
J. KENNETH CATLAW, M.D.
Jersey City, N. J.

Duodenocolic fistula is a rare disease which may be of benign or malignant origin. McClinton[1] in 1944 reported four cases from 1885 to 1940 of benign origin which followed perforation of duodenal ulcer; he then reported a fifth case. Ulcerative colitis may also perforate and cause a duodenocolic fistula. However, the majority of the few cases reported are due to malignancy of the hepatic flexure or proximal portion of the transverse colon. The scarcity of reports of this condition are due to its rarity and the fact that the patients are apparently hopeless and consequently are not investigated fully. In 1935, Mindline and Rosenheim[2] stated they were unable to find any case reported in the literature in which a fistulous opening existed between the duodenum and colon due to malignancy; they reported one case.

From 1907 to 1945 inclusive, 1,400 cases of carcinoma of the right colon were seen at the Mayo Clinic[3], eight involved the duodenum, and only two cases of duodenocolic fistula were found. The youngest was a woman 29 years of age, and the oldest was a male 69 years of age; the average age was 49½ years. All had symptoms for six or seven months prior to admission.

The second portion of the duodenum is most frequently involved. At this time we may point out that 6 per cent of all perforations of duodenal ulcer occur in the second and third portion of the duodenum, but only five cases of duodenocolic fistula have been reported due to ulcer, because the rest are acute perforations. Usually duodenocolic fistula results from a large fungating, ulcerating adenocarcinoma of Grade II or III, which perforates slowly through the colon and into the duodenum. The lymph nodes are usually markedly involved and the mass is rather large and usually fixed.

*Read before the Annual Convention of the International Academy of Proctology, Atlantic City, N. J., 10 June 1949.

†From the Services of the Jersey City Medical Center and St. Francis Hospital.

In one case, reported in 1933[4], the carcinomatous growth, in addition to forming duodenocolic fistula, caused traction on the sphincter of Oddi, causing it to remain wide open with consequent regurgitation of the duodenal contents into the biliary tract and a resulting cholangitis.

The symptoms of duodenocolic fistula are those superimposed upon the initial lesion, whether it is duodenal ulcer (although some ulcer cases may have no prior symptoms) or carcinoma of the right half of the colon.

Diarrhea is present with startling suddenness, there may be ten or twelve or more stools daily. It is lienteric and steatorrhearic, that is, undigested food and a large amount of fat content in the stool; blood may or may not be present.

Fecal vomiting may occur with the vomitus resembling the stool in appearance and odor. There are eructations of foul gas, which the patient characterizes as the odor of rotten eggs or feces. Distention is marked. There is rapid weight loss, weakness, a severe anemia of the macrocytic type, with a loss of the antipernicious anemic factor. Edema may be present due to hypoproteinemia and may be generalized. Avitaminosis is very marked and symptoms due to this occur, such as night blindness, dry red tongue, fissures and cracks about the angles of the mouth, pellagra-like skin lesions, neuritis, and circulatory changes. Changes in the porosity of the bones, sometimes with deformity may occur. Scurvy-like symptoms may appear. Tetany sometimes occurs in the later stages. Dehydration is great and marked disturbances in electrolyte balances are found. Hypoproteinemia is severe and there is a reversal of the albumin globin ratio. There may be clubbing of the fingers.

The results of duodenocolic fistula may be mistaken for sprue.

Calcium and phosphorus metabolism is definitely disturbed, as shown by serum sodium and phosphorus determinations. A mass is most often felt in the right upper quadrant which is quite large, hard, irregular and fixed. If the liver is involved by metastasis, nodularity may be present.

There are several theories to account for the symptoms:—

1. Gordon Murray pointed out that the gastric secretion continuously dripping into the colon causes a severe colitis with marked hyperperistalsis and excessive secretion of mucus. Experimentally this has also been shown to occur by the injection of a drop of dilute hydrochloric acid into the colon and even as much as ten minims may cause passage of blood per rectum.

2. Some have thought the food passing from the duodenum directly into the colon was the chief factor. However loss of food from the stomach and duodenum is not significant in most cases, but where the barium passes from the duodenum into the colon, it may be.

3. Opposed to the Gordon Murray theory:—Rapid loss of weight and physical deterioration is rarely caused by starvation nor is diarrhea caused by gastric contents entering the colon. You can pass a Miller-Abbott tube past the fistula and feed these patients 5,000 calories per day, with no improvement in the diarrhea.

The entrance of colonic contents into the duodenum, thence into the upper jejunum, causes intense irritation and violent hyperperistalsis. Digestion is disturbed, absorption of food is poor but absorption of the toxic contents of the colon may take place. These are the real causes of the physical deterioration and train of symptoms.

Diagnosis is made by barium enema, which in both benign and malignant cases, definitely shows the fistulous communication between the colon and the duodenum, the stomach and the duodenum being rapidly filled by the barium enema. Gastrointestinal series in duodenocolic fistula shows in duodenal ulcer, irregular cap scarring, some obstruction, pooling of barium near the second portion of the duodenum. The series rarely shows the fistulous tract. Fistula varies in size and length. Insufflation of air is helpful in diagnosis of this condition. In carcinoma of the colon, barium enema shows the usual signs plus the fistula.

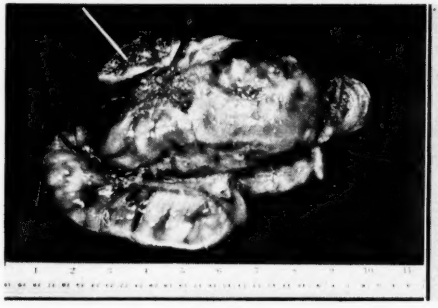

Fig. 1

Fig. 2

Fig. 1—Specimen A. showing cecum, ascending colon, hepatic flexure, portion of the transverse colon and ileum. Showing portion of the duodenum attached to hepatic flexure with fistulous opening.

Fig. 2—Same specimen opened up, showing fistula between the colon and the duodenum.

Indications For Treatment

Most of these cases are apt to be too late for surgery, but, on the other hand, as in most cases of carcinoma, if possible, a block dissection should be done for possible cure and palliation; this, however, is not necessary in the benign cases of ulcer. These cases look almost hopeless. They definitely have a markedly contracted blood volume and may need three or four thousand c.c. or more of blood to restore blood volume to normal and correct the anemia and hypoproteinemia. Dehydration and electrolyte imbalances are great because of the tremendous loss of fluid by diarrhea and consequently, huge quantities of fluids and minerals, particularly in the form of Hartman's 1/6 molar sodium lactate and Ringer's solution, with ten or fifteen per cent glucose and amino acids should be given. Amino acids are useful but are too slow in their effect for preoperative treatment (it usually takes twelve days to affect the hypoproteinemia) and consequently transfusions are used most liberally. Blood and urine should be checked con-

tinuously for chlorides (Fantus method for urinary chlorides can be done at the bedside). Sufficient vitamins should be given parenterally to correct the deficiency.

Selection of the type of anesthesia is very important because they are poor risks. Local and intratracheal types are best.

Operative Procedures

These may be done in one or more stages.

1. One stage resection of the right half of the colon, terminal ileum, the fistula and part of the duodenum, with closed anastomosis end-to-side of ileum to colon, and end-to-end anastomosis of duodenum (or repair of duodenum may be done, particularly in duodenocolic fistula due to ulcer). However, it has the following disadvantages: it is not a block dissection which is indicated in modern cancer surgery and it is a procedure of great magnitude in a poor risk patient. It cannot be done if the bile duct is involved.

2. Resection of the right half of the colon, terminal ileum and portion of the duodenum containing the fistula, with end-to-end anastomosis or repair of the duodenum, and Lahey-Mikulicz type of anastomosis of the ileum and transverse colon may be done. Previously it was thought repair or end-to-end anastomosis of retroperitoneal portion of the duodenum was always followed by fistula formation. This has proven to be fallacious and can be done. This too has certain disadvantages. It is not a block dissection.

The loss of fluid and electrolytes, postoperatively, is great and it cannot be done if the bile ducts are involved. However, it can be done faster than the preceding operation, and danger of postoperative peritonitis is much less; *it can be done in ulcer.*

Multiple stage procedures are excellent because the first stage usually corrects diarrhea with its attendant disturbances of fluid and electrolyte balance, etc. and the patient can be put into better condition for a block dissection, removing the right half of the colon, terminal ileum, distal portion of the stomach, the duodenum and the head of the pancreas, and all glands. In cases of duodenocolic fistula due to benign causes, resection is definitely less radical.

1. The first stage can be a simple ileocolostomy after division of the terminal ileum, under local or regional block anesthesia, if it can be shown (by x-ray) that the duodenal contents do not enter the colon. This is safest, if possible, or—

2. The first stage may consist of division of the stomach, closure of the distal end, gastroenterostomy, division of the terminal ileum and anastomosis of the ileum to the colon, well beyond the growth, end-to-side union is preferable. Thus, by dividing the stomach and doing gastroenterostomy, it prevents entrance of the gastroduodenal contents into the colon. Ileocolostomy after division of the terminal ileum prevents regurgitation of feces through the fistula and into the upper gastrointestinal tract. This type of operation, with later block dissection, was suggested by Linton[6] and done on two cases with satisfactory postoperative results. Anesthesia should be intratracheal; cyclopropane or ether being used.

The block dissection consists of the removal of the stomach, duodenum, head of the pancreas, right half of the colon and the terminal ileum. The end of the colon is closed, the jejunum is transected, the distal end brought up, the common duct and pancreatic duct implanted into it at different levels, the proximal end of the jejunum implanted end-to-side, well below the common duct and pancreatic anastomosis, so that the food and intestinal contents will not regurgitate into the biliary tract.

Postoperative Treatment

Meticulous with regard to the fluid electrolyte balance and a urinary output of at least 1,000 c.c. daily preferably 1,500 c.c.

Transfusions should be given freely during operative and postoperative period.

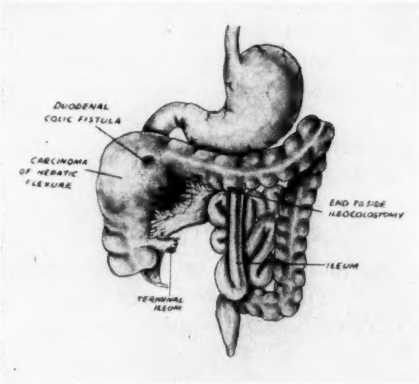

Fig. 3

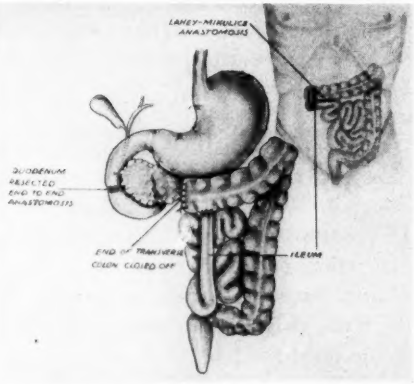

Fig. 4

Fig. 3—Ileo transverse colostomy. End-to-side anastomosis, distal end closed.
Fig. 4—Right half of colon with growth and portion of the duodenum removed. Duodenum repaired end-to-end, distal end of colon closed. End-to-side anastomosis of ileum to colon.
Insert.—Resection of colon with growth, fistula and part of duodenum, end-to-end anastomosis or repair of duodenum. Lahey-Mikulicz anastomosis of ileum and colon.

Oxygen is a valuable adjunct. Penicillin, streptomycin and sulphadiazine should be given to prevent complications.

Complications and causes of death are—shock, peritonitis due to contamination or leakage, pulmonary (atelectasis, pneumonia), embolism and hemorrhage. All of which are theoretically preventable.

Drake[5] reports one successful case resected in October 1940; no follow-up.

Mayo[3] (1909) reports one case survived one year.

Linton[6] reports two cases, neither cured; one died after eight months.

Case Reports

Case 1:—E. D., 44 year old white male admitted March 12, 1945. Five months previously began to experience fatigue, weakness, lassitude and anorexia. He became progressively weaker and was conscious of a constant dull nagging

pain in his right side which was worse at night. Approximately five weeks ago he noticed a mass in the right upper quadrant which protruded, could not be reduced and was hard, seeming to increase slowly in size. He was hospitalized one month prior to admission and stated that x-rays taken at that time were negative. One week before being admitted he began to have diarrhea, stools were black in color at first and at admission have a faint pink tinge. Weight loss of 25 to 30 pounds in ten months. Hospitalized for observation.

Usual childhood diseases. Appendectomy twelve years ago. Duodenal ulcer six years ago, apparently cured one year ago with bland diet.

Family history:—No known family history of tuberculosis, diabetes, cardiac nor renal disease.

Rest of history:—Essentially negative except for present illness.

Physical examination:—Abdomen: hard, fixed mass the size of an orange in the right upper quadrant, entire abdomen is tender, spasm is marked on it. Mass is not reducible, dullness to percussion; remainder of abdomen tympanitic. Liver palpable on finger below costal margin. Spleen nonpalpable. No C. V. A. tenderness.

X-ray Findings:—Rectum, sigmoid, descending colon and distal half of the transverse colon filled well and are somewhat dilated. There is an extensive filling defect involving the proximal half of the transverse colon and hepatic flexure. The cecum and terminal ileum are displaced to the right. On the films taken after evacuation, barium is noted in the duodenum, jejunum and stomach which would indicate fistulous connection between the colon and the upper tract. On some of the films, there is a definite irregular canal noted connecting the hepatic flexure to the duodenum.

Barium given by mouth filled the stomach normally. Duodenal bulb showed irregularity probably due to a scarred ulcer. A definite fistulous tract was noted from the second portion of the duodenum to the hepatic flexure, where an irregular filling defect was again seen. The entire colon was filled within a few minutes. These findings corroborate the previous impression of a fistula between a carcinoma of the right colon and the duodenum.

Laboratory Report:—R.B.C.-3,800,000; W.B.C.-7,800; Hgb.-75 per cent. No. counted-70 per cent; Polys.-70 per cent; Small monos.-30 per cent; Blood sugar-86; N.P.N.-39.2; Blood type-"A".

Pathological Report:—Macroscopical Description:—The specimen consists of ascending and transverse colon measuring 25 cm. in length, received in formalin. Three cm. from one end there is a cylindrical mass 7 x 13 cm. which almost completely obstructs the lumen. The mass consists of firm grayish and pinkish tissue. Attached to the distal end of the transverse colon there is a small fistulous communication with the duodenum.

Microscopical Description:—Sections show masses of closely related small round cells which have scanty cytoplasm, oval nuclei, chromatic with a moderate

number of mititic figures. The neoplasm has a marked tendency to form round or glandular structures. There are massive areas of necrosis.

Pathological Diagnosis:—Infiltrating adenocarcinoma of the colon.

Case 2:—Mrs. A. K., an 81 year old white female seen by Dr. Macchia. Her chief complaint was weakness which existed three or four weeks prior to examination. It was accompanied by diarrhea which lasted one week, with no gross blood in her stool. Bowel movements later became normal. There was no temperature. Vomiting occurred, her appetite was poor. A week prior to examination there was some dysphagia. In two years her weight dropped from 217 to 122 pounds. Physical examination revealed a large, orange size, hard, movable, nontender mass to the right of the navel. Roentgen examination revealed fibrotic lesions in both lungs. The aorta was calcified. The esophagus, stomach and cap were normal.

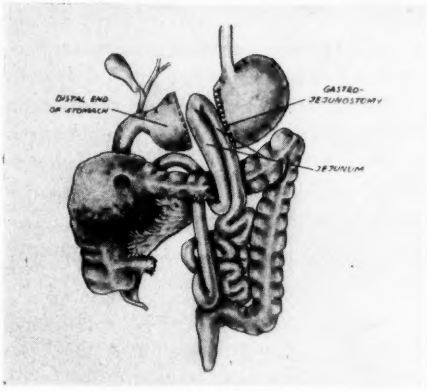

Fig. 5

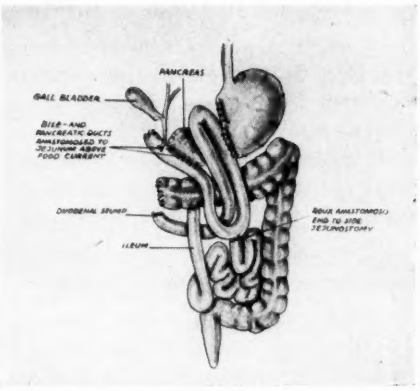

Fig. 6

Fig. 5—Transection of stomach, distal end closed. Hoffmeister-Finsterer gastrojejunostomy, end-to-side ileocolostomy.

Fig. 6—Resection of distal end of stomach, duodenum, head of pancreas, terminal ileum, right half of colon with growth and fistulous opening. Transplantation of common duct and pancreatic duct into jejunum, above the Roux anastomosis.

There was no pressure on the descending duodenum from which a fistulous tract could be seen, connecting with the mass in the hepatic flexure. The barium enema revealed the filling defect in the hepatic flexure and ascending colon with a tract connecting the descending duodenum.

Patient refused hospitalization and died several months later. No autopsy.

Case 3:—A. I., a 44 year old white male was admitted with a history of loose, watery bowel movements, up to ten or twelve daily for the preceding three or four months. He had also complained of epigastric pain coming on three or four hours after meals with occasional vomiting and a gastrointestinal series taken privately sometime before admission had been interpreted as showing a duodenal ulcer. He had noted a peculiar odor of "rotten eggs" to his breath for a month. No blood in stools.

Six months prior to his admission he had an appendectomy at another hospital.

On admission, the temperature, pulse and respiration were normal. Blood pressure was 100/60. The patient appeared pale, cachectic with evidence of marked weight loss and chronic illness. In the right upper quadrant there was a hard, tender, fixed mass the size of a grapefruit which seemed to be independent of the liver. Physical examination was otherwise not remarkable.

Laboratory findings:—Urinalysis-negative; N.P.N.-25; Blood sugar-99; Wassermann-negative; serum albumin-2.76; serum globulin-3.74.

A barium enema showed irregular filling defect in the region of the hepatic flexure with a fistulous connection between this lesion and the duodenum. The stomach and duodenum were filled in a retrograde manner.

Patient died three months later in another hospital.

Case 4:—A. B., a male white Italian, age 69 years, admitted to the hospital April 14, 1940, complaining of weakness and diarrhea of three months duration, the diarrhea had become worse in the last two weeks. Was well until six months prior to admission when he began to lose his appetite and strength. Weight loss of 35 pounds. Diarrhea in the beginning consisted of four or five movements daily, but the last two weeks, seven to fifteen per day. Had a bad taste in the mouth and foul odor to his breath and vomited foul smelling material.

Physical Examination:—Elderly, white, thin male, somewhat dehydrated and showing signs of loss of weight.

Findings:—Head, neck, heart and lungs essentially normal. Abdomen showed a large hard fixed mass about the size of an orange, well below the liver margin. Liver palpable but not enlarged or nodular. Rectal examination disclosed an enlarged prostate.

Laboratory Report:—R.B.C.-3,100,000; Hgb.-60 per cent; W.B.C.-7,600; Polys.-69 per cent; Monos.-1 per cent; Blood sugar-90; N.P.N.-42; Stool positive for occult blood, Guaiac Test.

X-ray Report:—Showed a filling defect in the hepatic flexure with fistulous communication between the colon and the duodenum. G. I. series was negative.

Operation:—First—Ileo transverse colostomy. End-to-side anastomosis, distal end of ileum closed; two layer. Improved definitely, diarrhea controlled, appetite improved and gained strength.

Second stage:—Done a month later and resection of right half of colon, terminal ileum and an inch of the duodenum, second portion below ampulla. Involvement of duodenum was minimal and a small fistulous tract present.

End-to-end anastomosis of duodenum, closure of end of transverse colon. Wound drained. Good recovery.

Improved for about two months, then gradually went down-hill and died at the end of seven months.

Pathological Diagnosis:—Infiltrating adenocarcinoma of the colon, Grade III.

Case 5:—J. D., 74 year old, white Italian male laborer, complained of epigastric distress and right upper quadrant pain since April 1949. G. I. series were negative. Had suffered a weight loss of fourteen pounds.

One month ago complained of diarrhea, seven to eight bowel movements a day, fetid breath and fecal vomiting.

Barium enema filled up colon to hepatic flexure and showed the colon and the stomach immediately. Prepared for operation. Mass found in hepatic flexure and fistula into the duodenum.

Biopsy showed carcinoma. Gastroenterostomy done. Patient died in four days.

Comments

The results are not encouraging, but two facts stand out:—(1) benign cases can be cured; (2) these cases are rare, the risk of operation is great but even if cure is not obtained, at least palliation is, and the mortality without operation is 100 per cent; (3) prevention by early diagnosis is most important if a fair survival rate is to be expected. This, of course, is the ideal in all cancer surgery but infrequently attained. However, this should not discourage us but spur us on to greater efforts.

Summary

Five cases of duodenocolic fistula reported, three proven by operation.

Diagnosis is made by x-ray, particularly by barium enema.

Operative technics are briefly discussed and radical resection as advocated by Linton[6] is considered the best procedure. This may be done in one stage.

Resection and anastomosis of the second portion of the duodenum can be done without fistula formation. This is useful in the benign cases.

We wish to express our appreciation to Drs. Benjamin A. Macchia, Joseph D. Napoli and Richard De Vincenzo for cases 2, 3 and 5.

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Discussion

Dr. H. A. Springer (Cincinnati, Ohio):—In duodenocolic fistulas that are nonmalignant, the duodenum is closed with interrupted sutures. An omental tag is sutured over this area of the duodenum. It was the late Roscoe Graham who so strongly advocated, in ruptured ulcers of the duodenum, not to do a gastroenterostomy but merely to close the ulcer with two or three interrupted sutures and seal it off with the omentum. If there is a great deal of induration in the transverse colon, we exteriorize the bowel and do a Mikulicz closure in stages. If the transverse colon is not constricted and greatly deformed, then a catheter is sutured into the bowel and the omentum is sutured over the entrance of the catheter. The catheter is brought out through the abdomen. This catheter is removed within two weeks and the wound closes within a few days.

In the cases in which there is a malignancy, we merely do an anterior gastroenterostomy with a long loop of jejunum, and then an enterostomy between the two loops of the bowel so that drainage from the duodenum and fistulas can empty into the small intestine. The ileum is transplanted into the sigmoid, while the distal end of the ileum is brought through the abdominal wall in the lower right hand quadrant for irrigation purposes. At the Southeastern Surgical Meeting at Hollywood, Florida in 1947, Sanders described the end results of the Dragstedt-Whipple procedures. He pointed out that after extensive work by these men and others the end results proved that only one patient lived as long at 18 months. Therefore, it was his opinion that the sidetracking operation as we describe it is the ideal palliative treatment in patients with an incurable disease.

MALIGNANT RECTAL POLYPS
FULGURATION VERSUS RESECTION AS TREATMENT OF CHOICE*

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Evidence is mounting in support of the observation that most carcinomas originate in polyps. Because polyps are potentially malignant, only their early detection and prompt removal—before they become malignant—will reduce the incidence of mortality in cancer of the colon.

Benign tumors of the colon include epithelial papilloma or adenoma, lipoma, fibroma, myoma, and adenomyoma. Of these adenoma and lipoma are the commonest.

Adenomas

Definition:—Adenomas are polypoid tumors, either sessile or pedunculated, single or multiple, and either diffuse or limited to one segment of the bowel. Two

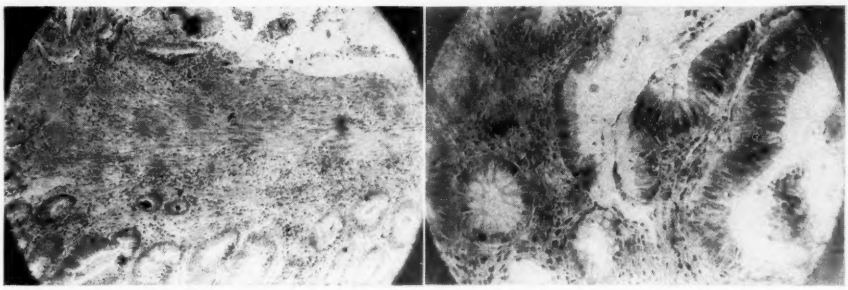

Fig. 1A Fig. 1B

Fig. 1—A: Low Power; B: High Power. Section consists of polypoid arrangement of glandular epithelium in which the cell outline is intact and the lumen is free of material. At the periphery of one portion of the section there are some glands which take dark blue stain as compared with the other glands but the cell outline is unaltered. Diagnosis:—Rectal polyp; early malignant change. Patient, a man, aged 59.

types of adenoma of the colon are recognized: (1) the adolescent or congenital type; (2) the adult or acquired type. Although both types may undergo malignant change, the adult type is more likely to become carcinomatous.

Gross Appearance:—The adolescent or congenital type appears as sessile or pedunculated, soft round masses of variable size projecting into the lumen. The adenomas are uniformly distributed in the colon or rectum. Adult or acquired adenomas are similar in gross appearance but more frequently are limited to one segment of the bowel, especially the rectosigmoid portion.

Histology:—Histologically adenomas consist of hypertrophic glands on a stalk of connective tissue having a rich blood supply (Figs. 1, 2 and 3).

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Etiology:—Chronic inflammatory lesions of the bowel are believed to be of etiologic significance in the development of these neoplasms.

Adenomatous polyps are without question potentially malignant. Many observers feel that carcinoma of the rectum, and to some degree, carcinoma of the large bowel, is often preceded by the development of papillomas or adenomas which may be single or multiple. When one adenoma becomes malignant, however, others present tend to disappear, so that at autopsy, none may be observed.

Lockhart-Mummery[1] says: "The most important factor in connection with simple adenomata, whether the single or multiple variety, is that they show a marked tendency sooner or later to become malignant. We are of the opinion that all adenomata of the rectum eventually take on malignant changes and in the great majority of cases in which large adenomata have been removed, malignant

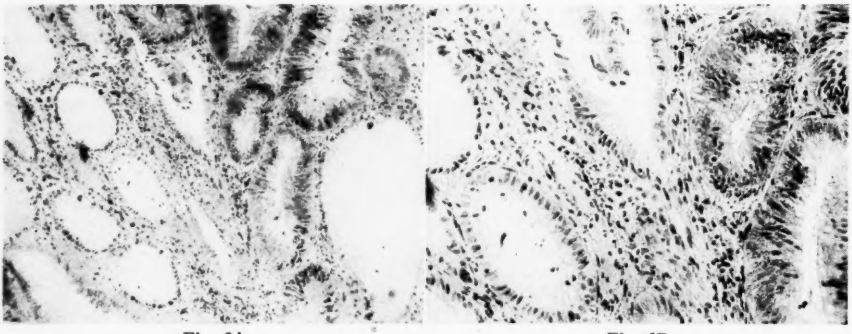


Fig. 2A Fig. 2B

Fig. 2—A: Low Power; B: High Power. Specimen consists of a polypoid arrangement of rectal mucosal epithelium. In one of the areas the epithelium takes a pale blue stain; in other areas, nuclei are stained deeply. Lumen of glands are somewhat elongated and dilated and some contain a granular débris. In other glands there is hyperplasia of the epithelium. Between these glands as well as supporting fibrous tissue stalk are areas of round cells and some eosinophiles with polymorphonuclear leucocytes. Diagnosis:—Adenocarcinoma, polypoid, of the rectum. Patient, a man, aged 68.

change has been found to have already occurred in some part or other of the tumor. So marked is this tendency for simple adenomata to become malignant, that personally we look upon adenomata as merely a stage in the development of malignant disease, and regard simple adenomata as a definitely precancerous condition. It follows from this that on no account should a single adenoma of the rectum be allowed to remain, even if it is causing no troublesome symptoms; it should be freely removed as soon as possible." Lockhart-Mummery has shown in his detailed study that the risks of cancer of the rectum are far greater in families afflicted with polyposis than in the population at large.

Pathogenesis:—The tumor may grow into the lumen of the bowel in the form of a large fungating cauliflower-like mass which soon becomes ulcerated, a characteristic of malignancy involving the ascending colon. A second type involving the descending colon infiltrates the wall, surrounding the bowel as an annular

growth which leads to an extreme degree of stenosis with late development of ulceration.

Mucoid degeneration may occur in the massive variety, the large bowel being the usual site of the so-called colloid carcinoma.

Tumor growth may take place anywhere in the colon but the incidence increases in descending sites from the cecum, the commonest area being at the sigmoid and rectosigmoid portions of the large bowel.

Following penetration of the muscular coat, metastasis is found in the long axis in the subserous tissue along the lymphatics. Involvement of the mesenteric and rectoperitoneal lymph nodes occurs later as does metastasis to the liver by the portal vein. The cancer cells may penetrate the serous coat and give rise to implantation growths on the surface of the peritoneum and pelvic organs.

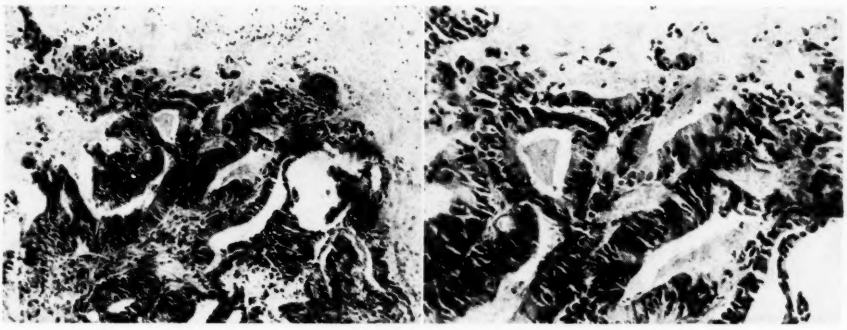


Fig. 3A Fig. 3B

Fig. 3—A: Low Power; B: High Power. Several portions of tissue are lined by a thickened stratified squamous epithelium. Beneath the epithelium are many glandular alveoli composed of hyperchromatic cells which vary markedly in size and shape. There are secondary gland formations, necrosis, and invasion of tissue. Diagnosis:—Adenocarcinoma of the rectum. Patient, a man, aged 61.

Symptomatology and Diagnostic Procedures:—Malignancy of the colon tends to produce few, if any, early symptoms inasmuch as the lesion arises from insensitive bowel mucosa. With a virtual lack of early symptoms, it is essential that all minor rectal discomforts be carefully investigated. A rectal digital examination should be performed routinely. The importance of this is underscored when one remembers that most lesions are found within a finger's reach from the anal orifice. Diagnostic adjuncts are the anoproctoscopic and barium x-ray examinations.

Prognosis:—The spread of cancer of the rectum is comparatively slow, so that the prognosis is correspondingly good. Growth takes place toward the lumen and also in the long axis of the bowel. Infiltration of the muscular coat is slower.

Methods of Treatment:—Radical surgical removal of all pathologic tissue is the ideal treatment. Several operative procedures have been devised through the years. These may be enumerated:

1. Abdominal perineal resection, perhaps the most radical procedure, consisting of the removal of the distal segment containing the tumor, either in a one or two stage operation with an associated colostomy.

2. Perineal resection alone, a less radical procedure.

3. Simple colostomy.

4. Excision and anastomosis performed in a one stage operation. In the presence of obstruction the mortality rate is highest in this method. The rate decreases in descending order of the following procedures:

5. Preliminary colostomy followed by resection and anastomosis from ten to twelve days later.

6. Anastomosis between proximal loops distal to the tumor, followed by later resection of the diseased colon.

7. Exteriorization of the tumor; cautery excision several days later, and re-establishment of the fecal stream by cutting the spur between the two bowel loops with ultimate closure of the loops.

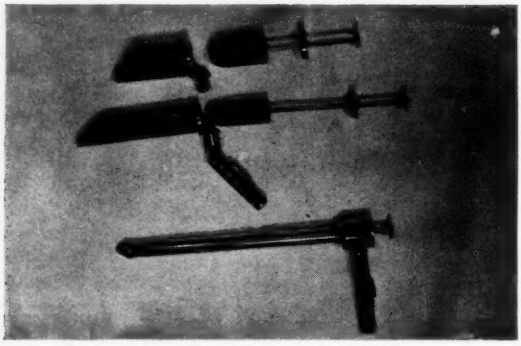


Fig. 4—Different types of sigmoidoscopes with light carriers attached.

8. Modification of the seventh method in which the tumor portion is excised by cautery at the end of the operation.

Evaluation of Procedures:—Palliative colostomy is of value only if it offers the patient an appreciable period of life prolongation. One should endeavor to diagnose the condition long before it reaches this stage. Colostomy with a posterior resection had been an accepted method for many years, but according to Mayo[2], this method should now be regarded as of only historical interest. Abdominoperineal resection is the operation of choice because it most nearly satisfies the requirements of proper removal of malignant lesions. The anterior resection with primary anastomosis usually is employed when the spread of the lesion is not too extensive. Mayo is of the opinion that this is not sufficiently radical.

Opinion differs as to which procedure is preferable: a two stage or one stage operation. Mayo believes that the one stage type is preferable because (1) it can be done in any case of malignant lesion of the rectum or rectosigmoid; (2) the

mortality rate in a high-risk patient or in the aged is not greater and may be less than in any other procedure; (3) it is the most reasonably radical of surgical procedures for malignant lesions; (4) an abdominal colostomy performed properly is neither stigmatizing nor difficult to control in most cases. Furthermore, the one stage type may be used even in the presence of metastasis as a palliative type of treatment. Mayo feels that the ultimate prognosis will average best following a one stage combined type. There are others, however, who feel that a one stage combined procedure is too severe a shock to the patient; thus, they consider a two stage procedure preferable.

Some surgeons have objected to colostomy on the basis of social difficulties for the patient which may produce neurotic tendencies. If the patient objects, moreover, crucial time is lost in waiting for the patient to accept the rationale of such a procedure. These advocate a primary anastomosis of the closed type. Others believe that primary anastomosis of the closed type is too dangerous and

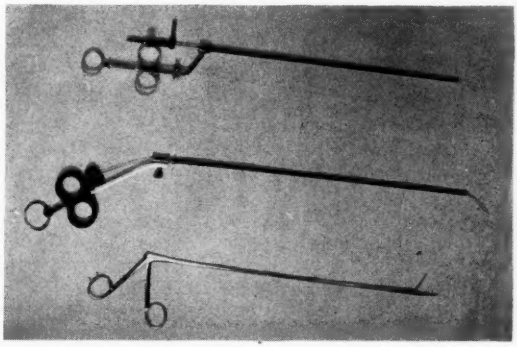


Fig. 5—Two top illustrations show electrocoagulating snares. Bottom illustration shows long alligator forceps.

that an intelligent patient will see the rationale of a colostomy as a basic part of the procedure.

When there is a dilated bowel, as in complete obstruction, colostomy is indicated. Primary anastomosis of the bowel can be performed when the bowel has not dilated or the cancerous process has not extended too far down into the pelvis. Perineal resection alone without abdominal resection should seldom if ever be performed.

The question remains whether a patient with an early malignant papilloma or adenoma should be treated by resection or by fulguration. In my opinion, early malignant growths of the rectum or rectosigmoid are best treated by fulguration.

Mayo[2] states that such lesions are amenable to fulguration regardless of the wall occupied. Graham[3] says that this is justified in such early cases when the patient can be examined frequently postoperatively for signs of recurrence. This is especially true in those cases in which the base of the polyp does not contain cancer cells. Buie[4], in his most recent report, states that fulguration is an effective

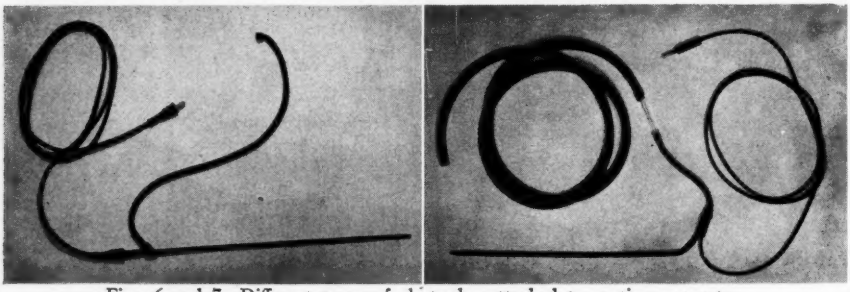
method, but care must be exercised in the selection of patients for this type of treatment. Usually a pedunculated polyp may be fulgurated regardless of its size or the position in the bowel, provided that adequate exposure of the polyp and entire pedicle can be obtained. Large sessile polyps require more careful consideration. If such a polyp must be fulgurated, prospects are best if it is situated on the posterior wall of that portion of the rectum which is not covered by mesentery. In that location there is little danger of injuring a vital structure, should it be necessary to destroy the wall of the bowel during the process of fulguration.

Clinical Studies:—Treatment by fulguration gave favorable results during a three year period in a series of 23 cases of early malignant growths of the rectum or rectosigmoid.

Sex:—Of the 23 patients, 8 were men and 15 were women.

Lesion:—The size of the lesion varied from 4 mm. to 3 cm. in diameter. Sixteen were of the sessile type; seven were pedunculated.

Fourteen of the lesions were found in the rectum and nine in the rectosigmoid. Of the sessile lesions, ten were on the posterior wall, four were on the lateral wall,



Figs. 6 and 7—Different types of electrodes attached to suction apparatus.

and two, on the anterior wall. Of the pedunculated lesions, three were on the posterior wall and four on the anterior and lateral walls.

Nineteen patients had single lesions; four had more than one lesion.

All lesions were freely movable and did not show infiltration into the deeper coats of the bowel.

Examination:—Examination included the contrast barium enema for all patients; which revealed no other lesion in the remainder of the colon. Three had some diverticula which were of no significance.

Treatment:—A biopsy was made for all patients. The microscopic report was "adenocarcinoma" (Figs. 1, 2 and 3). Malignant changes were observed at the periphery of the polyps. The pedunculated polyps were removed with electrocoagulating snare and the base was fulgurated. The sessile polyps were fulgurated, in some instances, more than once. There were very good results in all cases.

The longest time since the first treatment is three years; the shortest, two months. All patients have been seen at intervals of three months following operation. Sigmoidoscopic examination has not revealed a recurrence in any case to date.

Instrumentation:—The instruments used in this treatment are as follows:

1. A sigmoidoscope large enough in circumference to permit the entrance of the electrode (Fig 4).

2. An electrocautery snare, to remove pedunculated polyps (Fig. 5, two top illustrations).

3. An electrode which has a central opening and many openings on the sides. This electrode has an attachment which is connected to a suction machine by long rubber tubing. Smoke and liquid may be removed through this suction apparatus thereby permitting a clear dry field for the procedure.

4. Long alligator forceps to apply cotton swabs when necessary (Fig. 5, bottom illustration).

Comments

Results in 23 cases of malignant rectal polyps treated by fulguration are encouraging.

Early, single noninvasive carcinomatous polyps of the rectum and rectosigmoid can be treated safely and favorably by fulguration.

It is realized that the report is based on only a few cases and that the observation period has been too short for conclusions to be drawn. It appears, however, that there is justification in continuing this method of treatment so long as patients are examined at frequent intervals.

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Discussion

Dr. Ray H. Burnikel (Evansville, Ind.):—Dr. Portes, I'm sure I express the feeling of all the men present when I thank you for giving us such an excellent and complete paper. You have reviewed for us the types of lesions encountered in the lower bowel and traced their development and method of malignant degeneration and spread. You have also reviewed for us the various operative procedures for their surgical removal.

There has been considerable discussion of late of the proper handling of malignant polyps. Shall it be fulguration or resection? Certainly there is much to be said on either side. To lose one's rectum, if it is not necessary, cannot be taken

lightly. Your series of twenty-three cases will be added to the growing literature in favor of fulguration.

Isn't this pretty much the same question as complete abdominoperineal resection versus sphincter preserving procedures? The men who have given us large series of abdominoperineal resections or perineoabdominal resections, such as Rankin, Jones, Lahey and Mayo of this country, and Abel and Gabriel of England, all get five year survivals of roughly fifty per cent. This is with a procedure that removes the entire rectum, and so their argument to such men as Bacon and Dixon, and now Mayo, who are doing sphincter preserving procedures, is "If we get only fifty per cent survivals by taking out the entire rectum, what can you hope to get by leaving part of it?" There has not been sufficient time to answer this statistically.

From the work of Dukes we know that a most innocent looking growth of his Group A can have involved lymph nodes several inches away. We must admit that we just can't tell from the appearance, or at times even from a microscopic section, which ones will have distant involvement. Until we know more about carcinoma we must proceed with caution.

Surely no one will argue with us that fulguration is the ideal treatment for the benign adenoma, but we feel that it is in the classification of the tumor that much of the confusion arises. Some pathologists do not recognize the benign adenoma but are prone to call them all Grade I adenocarcinoma. Again, some of these adenomas will show atypical microscopic changes, which some of our pathologists call malignant changes, when actually they are not.

Binkley separates papillary adenomas into four groups:

(1) Tumors that are clinically and microscopically benign;

(2) Tumors which show microscopic atypical change;

(3) Papillary adenomas in which there are islands of adenocarcinoma; and

(4) Fully developed infiltrating carcinoma in which areas of benign papillary adenoma still remain.

We feel that this is a good classification and, if adopted, it would help to clear up some of the confusion. However, having a good classification doesn't help us when confronted with the decision of what to do with a tumor. Factors to be considered in estimating malignant probabilities are induration, ulceration, color and bleeding or oozing following moderate trauma to the polyp.

Swinton has reported twenty-two cases with mucosal polyps of the rectum and colon having early malignant change treated by local excision or fulguration. Some have been followed as long as seven years without recurrence, but he says, "When palpation of a tumor reveals induration, ulceration and fixation of the tumor, and a biopsy specimen taken from the periphery shows malignant change, radical resection is the only procedure indicated".

Certainly there are many variables to be considered when faced with the decision of the proper treatment, and no hard and fast rules can be laid down.

We often ask ourselves what we would want done if we were the patient. Usually that brings the problem home and makes the deliberation more cautious.

Dr. Portes, in his series, has selected his cases carefully and has taken into consideration the factors we consider important, namely: (1) the classification of the growth, (2) the absence of induration, (3) the absence of ulceration, (4) the absence of fixation, and (5) he has had good control of his patients with adequate follow-up. We feel that he is justified in continuing this method of treatment as long as he watches the patients very carefully and examines them at frequent intervals. This question of fulguration versus resection can be answered only by continued study and after sufficient time has elapsed for statistical analysis.

COMBINED POSTERIOR SPHINCTEROTOMY AND PECTENOTOMY

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Nowhere else exists such a lack of understanding of the fundamental anatomy of the region operated upon as is present in anorectal surgery. Many surgeons believe that there is no necessity for familiarizing themselves with the minute anatomical structures present in the rectoanal area. No more fallacious statement could be made; and as a result, our final operative results in this region are frequently poor.

The term "sphincterotomy" means an incision into the subcutaneous portion of the external sphincter. Whereas "pectenotomy" connotes a complete division of the pecten band. Because of the fact that in the past our operative results have left much to be desired when operating upon cryptitis, fissures, fistulae and variously placed pararectal abscesses, a number of American proctologists have readopted the custom of performing a sphincterotomy in the posterior midline. As a further step, if adequate results are to be obtained, this procedure, of necessity, must include a complete division of the pecten band whenever it is encountered. This combined, simultaneous sphincterotomy and pectenotomy, *performed in the posterior commissure,* has become increasingly more important as a correct operative procedure in anorectal surgery.

Anatomy of the Anorectal Musculature

Whitney[5, 6], Spiesman[4], Courtney[1, 2] and Eaton[3] have recently made important contributions towards anatomical clarification of the anorectal region. The external sphincter is composed of three portions, with two deeper segments (i.e., superficialis and profundus) which surround the internal sphincters. The subcutaneous portion is so placed that it becomes the most distally located subdivision. The conjoined longitudinalis muscle, which is a confluence of the longitudinal tenial bands of the colon, is of importance, in that it, together with some fibres from the levator ani muscle, encase the internal sphincter, surround the external sphincter, and are firmly inserted partially into the skin of the anus at the white line of Hilton in the intermuscular septum, and partially into the distal tip of the coccyx after traversing the adipose filled ischiorectal space. Of considerable importance is the fact that this longitudinal muscular band becomes fibromuscular in character as it approaches its anal skin insertion.

There are several usually ignored perianal spaces that are of great importance to the surgeon. One of the most important is Minor's triangular space, which lies between the two subdivided tangential legs of the superficial portion of the external sphincter, as they proceed posteriorly towards their attachment to the coccyx. Although somewhat inaccurate, in the interests of simplification, it may be categorically stated that the subcutaneous and deep portions of the external sphincter assume the shape of doughnut-like rings, respectively caudad and cephalad to this space. Minor's space should be termed correctly the posterior intermural

space to differentiate it from the superficial and deep postanal spaces which are caudad and cephalad to the tangential portions of the superficial external sphincter, and into which these two spaces potentially communicate. This possible communication is posterior and outside of the two doughnut-like deep and subcutaneous portions of the external sphincter.

In addition to these three spaces there are also the two ischiorectal spaces on the lateral sides of the anus and rectum, bounded cephaladly by the levator ani muscles, caudadly by the skin, laterally by the bones of the pelvic girdle, and medially by the lateral walls of the anus and rectum. Each ischiorectal space is further subdivided into the perianal and ischiorectal spaces. The perianal space is the superficial caudad portion of this area, being bounded cephaladly by a portion of the conjoined longitudinalis muscle that transverses the ischiorectal space. These muscular fibres pass between the subcutaneous external sphincter and the superficial external sphincter, and proceed posteriorly to insert themselves into the tip of the coccyx. Eaton[3] has pointed out that the conjoined longitudinalis muscle fibres intimately bind together the three portions of the external sphincter, in a web-like manner, thus allowing the careful anatomic division of these structures to be performed without the usual development of a permanent incontinence.

Pectenosis

The pecten band (pectenosis) is not a normal occurring anatomic structure. It is the result of inflammation, and is recognized as a fibrotic, white glistening band, occurring subcutaneously beneath the transitional skin of the anus in the region of the intermuscular septum, extending usually from Hilton's line caudadly to above the pectenate line cephaladly. This pathologic entity results from infection of the anal ducts that arise at the bases of the Crypts of Morgagni beneath the skin of the anus. The fibromuscular insertions of the longitudinalis muscle are changed into fibrous tissue, as the result of, or in the presence of, a chronic infectious process existing either within or surrounding the anal ducts. Gradually the intermuscular septum becomes replaced by a band of pearly white firm collagenous connective tissue. Spiesman[4] has shown in microscopic studies of the pecten band in pectenosis that this structure consists of extensive fibrosis, hyalinization, collections of lymphocytes and polymorphonuclear neutrophiles and some smooth muscle fibres. Another etiological factor is believed, by Spiesman[4], to be chronic passive congestion, resulting from either internal or external hemorrhoids.

The average normal thickness of the pecten band has been found by Spiesman[4] to vary between 340 and 760 microns, whereas the thickness of the pecten band in the presence of pectenosis may vary between 966 and 5,300 microns. The pecten band is always grossly demonstrated to exist coincidentally with infections of the anal ducts.

The development of this fibrous pecten band causes several pathologic results.

First—it may strangulate the neck of the anal ducts as they pass between the fibrotic fibres of the pecten band and the muscle bundles of the conjoined

longitudinalis muscle that bind together the subcutaneous and superficial portions of the external sphincter; or between the superficial and the deep portions of the external sphincter. The infected anal ducts may appear externally either as perianal fistulae, or the more laterally placed blind or external ischiorectal fistulae. If the neck of the anal ducts becomes strangulated by fibrosis of the pecten band, as these ducts transverse this structure, they may be converted into small, undrained abscesses which have the tendency to burrow. This burrowing results in most of the various types of perianal or perirectal abscesses, blind fistulae, complete fistulae and fissures.

Second—after time has elapsed, this thickened, contracted, fibrous pecten band prevents the proper relaxation of the sphincters. This process may finally result, in elderly patients, in the formation of an actual anal stricture.

Third—the continued thickening and fibrosis of the pecten band may anchor the anal skin to it. Or the pecten band itself may become an unyielding, avascular, fibrous tissue which may suffer splitting and tearing due to the trauma caused by the passage of stools. This in turn results in fissure or fistulae formation associated with constant anal discomfort. Thus, the clinical findings of fissures, posterior fistulae, abscesses and vague complaints of anal-rectal pain, usually means the presence of either chronically or acutely infected crypts.

In view of these facts, the simple, complete division of the pecten band as recently advocated by Spiesman[4], is often not adequate treatment, because of the fact that the majority of infected anal crypts lie in the vicinity of the posterior commissure, and are directed by the conjoined longitudinalis muscle into Minor's triangular space. In order to satisfactorily open and drain this space, it is necessary that the subcutaneous external sphincter be simultaneously divided by a posterior sphincterotomy. Complete division of the pecten band will allow about a four finger dilatation of the anorectal region. Therefore, anorectal divulsion has become obsolete. Pectenotomy does not result in incontinence as was so common following divulsion. Posterior sphincterotomy should not be practiced in patients with an ataxic sphincter or those having an absence of the anorectal angle.

In my experience, a combined posterior sphincterotomy and pectenotomy is indicated in the presence of a cryptitis (infected anal ducts), anal strictures, abscesses in posterior perianal region, posterior commissure complete or blind fistulae, posterior fissures, external or internal hemorrhoids, selected instances of pruritus ani, and if the necessity arises, for adequate intrarectal exposure. Whitney[5] has stated that when he uses the term "posterior sphincterotomy", he implies that a pectenotomy is included, if pectenosis is present. I believe that the term "posterior sphincterotomy and pectenotomy" is a more descriptive term, and one which will keep the operator constantly cognizant of the fact that frequently both of these anatomic structures have to be completely divided, if satisfactory permanent postoperative results are to be obtained.

This combined procedure has been so successful in my experience in the treatment of the above mentioned anorectal diseases, some of which in the past

have been notorious for their ability to recur, that I would be lost without it. Fissures and fistulae seldom recur since I have adopted this technic. Likewise, the patients' postoperative discomforts have largely disappeared. This operation, in conjunction with the performance of a hemorrhoidectomy, has materially benefited the patients' postoperative course, and added immeasurably to their smooth convalescence. False mucosal reappositions; stricture formation; postoperative pain and edema; external sphincter spasm; postoperative skin tab formation; and distressing, painful, late, constipated bowel movements, are minimized by this operative procedure.

Whitney[5, 6] and Spiesman[4] have adequately described this operative procedure. It is simply performed. I can highly recommend this simple additional intra-anorectal maneuver as being eminently worth-while, and one which will lead to a far happier group of patients in your proctologic practice with very few recurrences. This desirable final result will immeasurably add to your own peace of mind.

Conclusions

1. A plea is made to become familiar with the anatomy of the anorectal region.

2. No one should operate upon the anorectal area unless he possesses a well founded anatomical knowledge of that region.

3. A plea is made to recognize the common occurrence of a definite pathologic pecten band in the presence of anorectal diseases.

4. Posterior sphincterotomy plus pectenotomy is necessary as an adjuvant surgical procedure when successfully treating most anorectal diseases.

5. Pectenotomy has rendered entirely obsolete the former highly destructive and frequently incontinent causing procedure of anorectal divulsion.

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ULCERATIVE COLITIS

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After more than forty years experience in the practice of internal medicine and especially in gastroenterology, the senior author has noted a marked evolution in the diagnosis and treatment of the diseases of the digestive system. He well recalls when a diagnosis of "indigestion, dyspepsia, etc." covered a multitude of incorrect diagnoses. Succeeding decades have revealed great progress in the diagnosis and therapy in internal medicine. Since the older internist had directed his attention only superficially to organic and functional states of the digestive system, the cleavage between the internist and the gastroenterologic internist has become marked. A knowledge of internal medicine is a requisite for an understanding of gastroenterology, but his experience has been that some internists have not delved deeply enough into the many ramifications of gastroenterology. A well prepared internist has a very wide field to cover in considering the diseases of the cardiovascular system, lungs, kidneys, nervous system, the endocrines, blood, etc. Study of the diseases of these and other organs leaves very little time for the mastery of the functional and organic diseases of the stomach, small and large intestines, the liver and gallbladder, pancreas, colon, and the reflexes, which cause no end of gastrointestinal symptoms. When a gastrointestinal internist is called upon to make a diagnosis, he must be capable not only of considering the diseases of the digestive organs, but likewise disturbances referred to the organs of digestion by various pathways. Referring to the subject matter of ulcerative colitis, the senior author is convinced that, considering the prevalence of the various forms of diarrheas, medical schools should stress with considerable emphasis, lectures and the bedside teaching of diarrheas. It must be conceded that those who devote their time to the general practice of medicine are the physicians who see patients with digestive disorders long before those who specialize, and with a better understanding of the etiology and treatment of the diarrheas, it is conceivable that the number of chronic cases would be greatly reduced if they were recognized early by those in general practice.

A classification of the diarrheas as suggested by Kantor has been found practical in teaching students and may be worthy of restating here:

A—Functional
- I Simple or environmental
- II Gastrogenous
- III Putrefactive
- IV Fermentative
- V Endocrine
  - 1—Thyroid
  - 2—Adrenal

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VI Pancreatic
VII Sprue
VIII Nervous

B—Organic
I Toxic
Mercury
Arsenic, etc.
II Infectious
1—Specific or primary
a) Bacillary
Cholera
Dysentery
Tuberculosis
IX Simple Colitis
(irritable colon)
b) Parasitic
Protozoal
Amebic
Flagellate, etc.
2—Nonspecific
a) secondary to any of above whether functional, organic or due to new growth
b) Ulcerative colitis

With the above classification as a working guide and a well taken history, the general practitioner should be able to decide early if he requires the assistance of a gastroenterologist. Should the general practitioner decide to make the diagnosis and treat the patient, there are certain fundamentals that are most important. A complete history and a general physical examination; a fractional gastric analysis; an examination of the feces in each case, determining the presence of macroscopic or occult blood; a Gram differential count of the microorganisms present; incubation of the feces after a specially planned test diet containing proteins, carbohydrates and fats, and the use of a Baumeister incubation apparatus to determine whether the feces are excessively putrefactive or fermentative; inspection of the nose, mouth and throat, etc., for foci of infection, and so on.

In this paper we shall consider only the etiology, proctoscopic appearance and therapy of ulcerative colitis which, when taken together, constitute a working unit for the adequate handling of the condition. For all other phases of the subject the reader is referred to the numerous texts and monographs and to the papers cited in the bibliography.

Etiology

Although a voluminous literature has accumulated on the subject of nonspecific ulcerative colitis, no one knows about its actual cause or causes. In fact, all discussions of the specific etiology of this disease could be shortened to one word—*unknown*. Whether we view the condition from the standpoint of infectious, constitutional, deficiency, or other causes, we are finally forced to conclude that it is not a specific disease, nor a single disease. It is Bargen's opinion that there are numerous causes and that each cause produces a pathology differing from that produced by other etiological agents.

However, the traditional approach to the etiological study is under four common headings, and these and their subdivisions must be mentioned briefly. In the order of their importance, these are:

Infectious causes
Constitutional causes

Deficiency status causes

Unknown causes

Time may prove some as yet unknown factor now in the latter group to be the real cause.

Infectious Causes

The *dysentery* bacillus stands at the top of the list of infectious causes and indeed, of all types of etiology. Many physicians concur in the idea that chronic bacillary dysentery and chronic ulcerative colitis are one and the same condition, but in spite of some compelling and convincing evidence, the dysentery bacillus has not become universally accepted as the true etiological agent for this disease.

The *streptococcus* has been the center of much thought and investigation from the causative viewpoint, largely because of the work done by Bargen with his diplostreptococcus, but in spite of all this, the streptococcus, along with numerous other organisms which in time past have been incriminated etiologically, is now ranked as a secondary invader, and treated as such when present.

After eight years of study, Dragstedt et al have considered the *bacterium necrophorum* a very possible factor in causing the disease, but again the bulk of medical opinion places this organism in the ranks of the secondary invaders.

At the present writing no known *virus* can be ascribed the causative role with any degree of scientific certainty, and this also holds true for *fungi and focal infections.*

Lymphopathia and amebiasis are independent diseases which may co-exist with ulcerative colitis, but are not considered as causative agents of that disease.

Constitutional Causes

A similar uncertainty cloaks the constitutional causes as shrouds the infectious ones, yet their proponents are equally tenacious in their views.

Food allergy has as its greatest advocate Andresen who feels that milk is the offending factor in 84 per cent of the cases, and who has had commendable success in the therapeutic use of elimination diets. On the other hand, Bockus and other investigators have noted food allergy to be no more evident in ulcerative colitis than in other digestive diseases.

Nutritional deficiency states were once thought to be culpable for causing this condition, but the modern consensus of opinion is that they may be responsible for the chronicity of the situation but not for its initial onset.

Disturbed innervation of the colon deserves some thought in passing, but it has not yet been proven that abnormalities in the innervation of the colon or abnormal impulses passing over a normal innervation are responsible for the advanced pathology so often encountered in this disease.

Lium et al feel that the factors affecting the autonomic nervous system and the colonic innervation can and do produce grave pathological changes in the colon similar to those seen in many cases of ulcerative colitis; furthermore, they question whether sustained spasm (the frequent reaction of the digestive tract to psychic

trauma) does not inevitably play a major part in the origin and recurrence of the disease.

One of the highest ranking etiological concepts prevalent today is that of the *psychogenic or psychosomatic.*

In a splendid article on this subject, Groen gives the character study of ulcerative colitis patients which merits serious thought. He lists the following characteristics evidenced by such patients:

(1) A well developed intellect
(2) Carefulness and neatness often to an exaggerated degree
(3) Extreme sensitivity
(4) A hesitating unbalanced attitude toward the value of their own personality
(5) Egocentricity
(6) A passive attitude toward life
(7) Fearfulness
(8) A striking lack of aggressive tendencies
(9) A great need for love, sympathy or affection
(10) An exaggerated, idealistic, sometimes a positively naive, infantile conception of love
(11) In males an abnormally strong fixation on the mother, often combined with fear of the father
(12) Difficulty in inducing them to talk about their inner life

Naturally, this concept has been attacked from various angles, but in many years experience with this disease one of us has seen only one case of ulcerative colitis adequately studied by a competent psychiatrist which was declared to be free in all respects from some psychic defects which might be considered the cause of his condition.

Deficiency of an Intrinsic Protective Factor Normally Present in the Bowel Mucosa

Investigators working according to this concept have found an increase in the lysozyme activity in the diseased bowel. This lysozyme is a mucolytic ferment which removes surface mucus. It has been known to cause the disease in dogs. Its titre in normal cases is from three to nine, but in ulcerative colitis it has been found to range from 73 to 466. It declines steadily as the diseased state lessens and clinical improvement becomes manifest.

Obviously, the how and why of these phenomena, together with many other questions, remain to be satisfactorily answered before either the deficiency of the intrinsic factor protecting the mucosa, or the increased lysozyme activity can be accepted as etiological agents.

Unknown Causes

Under this we may include a theory of one of the authors (R.R.) namely, that the same factor or factors which produce peptic ulcer when operating in the stomach or duodenum produce ulcerative colitis when operating in the large bowel.

The differing types of pathology seen in each location are due to the different histology and physiology of the organs concerned.

Since we do not know the cause of the one we may not apply it experimentally to the other, but most of the agents listed above as possible causes of ulcerative colitis, together with many others which space does not permit us to mention, have been considered to be operative in the causation of peptic ulcer.

Proctosigmoidoscopic Examination and Appearance

Proctosigmoidoscopy is an essential part of the diagnostic survey in chronic nonspecific ulcerative colitis. Indeed, it is usually the most important part of the study, since by this means alone the diagnosis can be made in the great majority of cases due to the fact that the rectal and rectosigmoidal mucosa are the sites of involvement in almost ninety per cent of the cases, thus rendering the pathology readily visible through the scope.

The most favorable time for proctoscopic examination calls for a certain amount of judgment on the part of the examining physician. In some cases the patient may be too ill when first seen to permit a thorough examination or even the insertion of the scope for a few centimeters through the anus while lying in bed. Such cases include those with fulminating diarrhea (30-40 stools daily) together with fever, emaciation, weakness, and severe anorectal spasm and tenesmus, plus excessive muco-pus and macroscopic blood, which combine to make the insertion of the scope intolerable to the patient and difficult or impossible for the examiner.

Throughout the examination the physician must always keep in mind that many of the agents noted under etiology are constantly operative, so that from time to time he may see an ever-changing appearance of the bowel mucosa, due to such factors as the age of the disease, the virulence of the etiological agent or agents, and the individual's reactive powers. He must also be alert to recognize such changes as hyperplasia, polyposis, fistulae, and malignant degeneration, which latter forms a very real threat in all cases of this disease.

At the actual examination the physician may note minute hemorrhagic spots in the mucosa and numerous submucosal petechia. These changes may be so slight as to make the conscientious physician hesitate to pronounce so serious a diagnosis on such scanty findings.

On the other hand, the more typical picture may present itself—an hyperemic, glossy, edematous mucosa which, after swabbing, presents a granular surface with numerous bleeding areas, all associated with excessive mucus secretion. Small and shallow ulcerations may or may not be present at this stage.

According to the severity of the case, there may be constant oozing of blood from the mucosal surface with marked bleeding after swabbing, and extensive ulcerations of varying size and depth with a mucopurulent exudate.

Finally, the most advanced cases show all of the preceding changes up to the stage of little or no normal mucosa; a tenacious membrane not unlike a diphthe-

ritic one, and large amounts of muco-pus and blood. Varying degrees of spasm are associated with the above findings.

The more chronic cases may manifest a contracted lumen with no normal anatomy apparent. The lining of the gut will be edematous and congested with numerous ulcers, bleeding or not as the case may be. In the more destructive types the entire mucosa may be denuded with polypoid or hyperplastic areas or stricture. A purulent discharge is invariably associated with the above changes.

Hence no single diagnostic aspect of this disease can be given, but the physician who is privileged to study a number of cases, soon learns to make a diagnosis and to place the case in its proper category.

Therapy

Just as no single etiological concept has gained acceptance as the causative agent of chronic nonspecific ulcerative colitis, so no single method of treatment is satisfactory. There should be made an etiological diagnosis if, and when possible, but even when such a diagnosis exists any one method of treatment must fail.

In order even to touch upon the voluminous subject of therapy in this disease in some sort of an orderly and logical fashion, we shall follow an outline of therapy recommended by Kiefer with certain additions and modifications.

Medical Treatment

I. *Palliative and supportive measures*:—

1. *Control of diarrhea* (a) *Bed rest*

(b) *Sedation*:—Any of the familiar sedatives such as the barbiturates, bromides, etc., may be used for this purpose. Some cases may be so severe as to require the judicious use of small doses of opiates.

(c) *Bowel rest*:—This is accomplished by other phases of the treatment to be discussed, but it may be enhanced by the use of such substances as belladonna tincture, atropine, papaverine, deodorized tincture of opium, etc., in appropriate doses and often pushed to tolerance. Betanaphthol bismuth in ten grain doses every 3-4 hours has been found helpful by the authors.

(d) *Substances tending to aid in producing a formed stool*:—Such substances as kaolin, bismuth subnitrate and calcium lactate are too well known in this respect to deserve further comment. They may be combined in varying proportions and combinations, and mixed with sedatives and/or antispasmodics given between meals and upon retiring as the physician sees fit. The hydrophilic colloids have been found soothing and helpful in some cases, and Portis recommends sodium alkyl sulphate 200 mg. t.i.d. It must be remembered, however, that occasionally a case will be made worse by this treatment and their initial use calls for vigilance.

(e) *The "medical ileostomy" of Machella and Miller*:—This is a procedure devised to divert the contents of the small bowel and at the same time to present an adequately nutritious and easily absorbable diet. Briefly described, the procedure consists of inserting a 16 F Miller-Abbott tube through the nose until its

tip is just short of the diseased area as shown by the x-ray. The balloon is then deflated, the tube anchored, and constant suction applied to prevent the contents of the healthy gut from entering the diseased region.

The tube requires constant attention to prevent occlusion of the lumen and should be fluoroscopically checked each day for its position, withdrawing it from the diseased zone if and when it should enter it. This latter can be diagnosed by the difficulty in keeping the tube patent and by the increase in the number of stools.

Through the tube the patient is fed 200-400 cc., every two hours from 6 A.M. to 10 P.M., of a solution, each gram of which contains 2 calories of carbohydrate and 1.8 calories of protein. The caloric requirements are calculated as 20 calories per pound of *normal weight*. In addition, the following vitamin and mineral supplement is given:

Thiamin hydrochloride 10 mg. t.i.d.
Riboflavin 5 mg. t.i.d.
Nicotinamide 100 mg. t.i.d.
Ascorbic acid 100 mg. t.i.d.
Vitamin K 2 mg. daily
Vitamin A 5,000 units daily
Brewer's yeast, 3 tablets t.i.d.
Sodium chloride, ½ gram t.i.d.
Ferrous sulfate, 0.2 gram t.i.d.

Water is given as desired and the patient is permitted to suck on hard candy should he become distressed by a bad taste in the mouth. Other types of therapy, transfusions, etc., are to be given as indicated.

The tube is kept down 7 to 15 days, and only withdrawn when the volume of aspirated fluid decreases sufficiently to indicate that the bulk of the ingested nutrient solution is being absorbed, and the patient is showing clinical improvement. After withdrawal the status quo is maintained until sigmoidoscopy shows evidence of healing, after which low residue foods are added to the diet which is gradually increased.

(f) *Total parenteral alimentation and therapy of Paulson*:—This consists of the interdiction of everything by mouth including water, with the complete maintenance of the patient by parenteral means. It is recommended by its originator only for the fulminating and intractable cases with nothing remaining in the case of its failure but ileostomy.

The patient is given a solution of Amigen and glucose calculated to supply 25 calories per kilogram of body weight at complete bed rest. At least 2 grams of glucose are allowed for every gram of protein. Sodium, potassium, and calcium chlorides are added as required, and whole blood and plasma are given as indications arise. Vitamins are given intramuscularly. The procedure is discontinued when the stools have been reduced to from 2 to 4 movements in 24 hours for two consecutive days.

(g) *Diet*:—Complete dietaries of the treatment of ulcerative colitis cannot be given here. Suffice it to say that the diet must be smooth and of low residue with a high protein and carbohydrate content. As a general rule, starches should be somewhat reduced and the vitamins increased as far as is consistent with the general plan of a low residue diet. The protein content should reach at least 120 grams daily and preferably more. Food allergies must be anticipated and all efforts made to protect the patient should such a condition exist.

2. *Correction of Malnutrition*:—(a) *Diet*:—All the above remarks on diet apply with equal emphasis here. Diet should be adequate, whether given orally or intravenously. If possible, extra feedings should be given between meals and upon retiring and every effort made to stimulate the intake and assimilation of badly needed nutritive elements.

(b) *Vitamins*:—The list of vitamins given above represents an adequate intake of these substances in the average case. It might be well to add to that daily intake Pantothenic acid in doses of 50 to 75 mg. daily. It must be clearly understood that such doses should be increased, and in some instances doubled, in the more severe and fulminating cases with profuse diarrhea, emaciation, etc.

(c) *Adequate water and mineral therapy*:—The constant loss of fluids and minerals due to the diarrhea requires complete laboratory checks of the blood chemistry and fluid balance in order that adequate amounts of fluid and minerals including iron, may be returned to the body to compensate for their loss. The presence of acidosis must be recognized and treated and a constant watch maintained for iron deficiency.

The modern physician is thoroughly trained in such matters but he must keep them constantly in mind, and in few diseases is this as important as in ulcerative colitis.

(d) *Adjunct therapy*:—We can pause only long enough here to mention a few therapeutic items, but it is in this category that the therapeutic art and skill of a physician will have ample opportunity to display itself. Crude liver extract in doses of from 2 to 5 cc. intramuscularly as deemed necessary by the physician has been very helpful in the management of some of these cases. Choline should be given where evidence of liver damage exists. Physiotherapy, particularly in the form of ultraviolet light irradiation, is of marked benefit and merits a trial in all cases.

3. *Correction of the Depletion of the Blood Proteins and Electrolytes*:—(a) *Transfusions of blood or plasma*:—Cases with anemia should receive transfusions of whole blood at frequent intervals until the blood constituents are within normal limits. Hypoproteinemia, shock, and severe illness may call for one or two units of plasma daily. This type of therapy increases the protein intake and may also be of marked benefit to the case by reason of the specific immune bodies believed to be contained within the plasma. It is a *sine qua non* in severe cases and as a pre- and postoperative measure.

(b) *Adequate water and mineral therapy*:—See the above discussion on this subject.

4. *Correction of any known existing foci of infection*:—This is self-explanatory and needs no elaboration except to point out that the *diseased colon itself may act as a focus,* and endanger the integrity of the joints, liver, and other organs, causing arthritis of various types. Such cases may rarely become so severe as to indicate surgical removal of the colon.

5. *Correction of any known existing emotional conflicts, etc.*:—Psychotherapy is recognized today as one of the legitimate forms of treatment for this disease. The intensity with which it is applied, however, depends upon the weight given to various psychogenic factors as etiological agents and upon the physician's ability to suspect them and to bring them to the surface.

The services of a competent psychiatrist are considered as being indispensable in the adequate handling of a case of this disease. Important as psychotherapy is, it should never be used or attempted on an acutely ill patient, but deferred until such time as the physical symptoms are under control and the patient is better able to receive, respond and benefit from the psychiatrist's visits.

II. *Treatment of the Inflammatory Process in the Colon*:—

1. *Bacteriophage*:—This substance may be used orally, rectally, or intravenously. Bockus reports a few cases which responded to a combined rectal and intravenous administration, but it is not an effective or generally accepted therapeutic agent.

2. *Sera*:—(a) *Polyvalent antidysentery serum*:—Because of the place that the dysentery bacillus held in the minds of some as an etiological factor, this serum has had a considerable vogue in therapy. Kiefer feels that it is useless while Bockus recommends its use in every fulminating case of ulcerative colitis unless the possibility of bacillary dysentery can be absolutely excluded. Otherwise its use has been gradually replaced by the sulfonamides and the antibiotics.

(b) *Nonspecific E. coli serum*

(c) *Bargen's serum*

(d) *Streptococcal sera of various types*:—All these sera and many others are now considered to exert a possible action upon the secondary invaders of the bowel and any good effects prevailing after their use are presumed to be due primarily to a nonspecific protein reaction.

3. *Vaccines*:—(a) *Diplostreptococcus vaccine*:—This substance is no longer considered to be specific in the treatment of this disease, and its effect, if any, is presumed to be nonspecific in character.

(b) *Staphylococcus auto vaccine*:—Heazlett reported a small series of cases treated by an autogenous vaccine from whatever strain of staphylococcus was found in the nose or colon ulcers. The vaccine contained one thousand million organisms per cc. and was given twice weekly in doses beginning with 0.05 cc. and increasing by 0.05 cc. per dose up to 1.00 cc. according to tolerance. A

general diet was permitted. All cases (7) improved by x-ray and sigmoidoscope, but the series is too small to be significant.

(c) *Stock Vaccines*:—In addition to the above, all types of stock vaccines have been used, but they probably act only as a nonspecific protein to stimulate a beneficial reaction.

Paulson states that he gave up all types of sera and vaccines as early as 1930.

4. *Sulfonamides*:—These drugs are *not* a cure for this disease as many authors agree, even those who use them freely and feel that they obtain good results therefrom.

Extensive investigations by Block and Pollard led them to conclude that the sulfonamides are a valuable adjunct (but only an adjunct) to therapy. They group them into two groups—a) those with a primarily systemic effect, and b) those with a local effect. Members of group "a" include:

Neoprontosil	Solazopyrine	Sulfapyridine
Nisulfadine	Sulfadiazine	Sulfathiazole
Nisulfazine	Sulfanilamide	

Members of group "b" include:

Sulfaguanidine
Sulfasuxidine
Sulfathaladine

The authors feel that those with a local action are more satisfactory in inducing remissions with sulfathaladine coming first and sulfasuxidine a close second. However, the drugs selected must be given for a long time.

The systemically acting absorbable sulfonamides are effective in the acute toxic febrile stages, but are not good for prolonged use as they themselves may cause a toxic reaction.

Kiefer feels that sulfaguanidine is perhaps helpful, while Bargen prefers neoprontosil and sulfathaladine for streptococcal cases and neoprontosil for cases of unknown origin. Paulson prefers sulfasuxidine and sulfathaladine.

There are many other references to the use of the sulfonamides in the literature but we must consider the fact that they are not curative, and that the soluble ones are capable of producing a toxic reaction in susceptible individuals. The insoluble types have a well-established place in the preoperative preparation for colon surgery, etc.

5. *Antibiotics*:—We must preface our remarks to these substances by that just stated above, namely, that they are *not* a cure for this disease.

(a) *Penicillin*:—The consensus of opinion is that while ineffective as to cure, penicillin is a valuable adjunct for the acute febrile complications and for the acute fulminating streptococcal cases. Otherwise it is considered as ineffective or useless.

(b) *Streptomycin*:—This drug has not been too well evaluated as yet in this disease. Crohn, after an extensive military experience with the drug, feels that the poor results reported by the army were to be expected because of its use

in the ordinary type of case. He feels that every fulminating case should be treated initially by streptomycin 2 to 3 grams intramuscularly and even orally, daily.

Other investigators believe that while it may be life saving in controlling the fever and toxicity of acute exacerbations, it is otherwise ineffective to useless as to cure.

(c) *Chloramphenicol*:—The use of this relatively new antibiotic agent has been suggested since it is active against many organisms which have been incriminated in the etiology of ulcerative colitis, but it is still too new to have been fully evaluated. In its favor are the facts that it is effective when given orally and rectally and that it is well tolerated and of rapid action. The dose is 50 mg. per kilo of body weight per day.

6. *Miscellaneous Therapy*:—(a) *Nonspecific protein Therapy*:—Crohn is of the opinion that any method of intravenous therapy which gives rise to a reaction with chill and fever can and frequently does start a remission. He lists such substances and phenomena as:

Mercurochrome

Acriflavine

Antidysentery serum

Typhoid vaccine

Transfusion reactions

Accidental transfusion with malarial blood, etc., as having produced improvement in some cases, but points out that the reaction is not curative.

(b) *Fever Therapy*:—Any of the above substances, by creating a fever, may contribute to this type of therapy. Artificial fever therapy, on the other hand, should be used with considerable caution as the very ill patient cannot well withstand the strain it puts upon him. To date there has been no real proof of its value.

(c) *Antiallergic Therapy*:—If a food allergy exists which is believed to be the cause of the colitis, allergy test diets should be used in order to eliminate the offending allergen. Such diets are difficult to use and require the ultimate in patient cooperation, but splendid results have been claimed for them by Andresen.

The antihistaminics have been of no use practically in this disease, although theoretically an allergic etiology would seem to indicate their use.

(d) *Antiamebic Therapy*:—Such a treatment is useless except to clear up a coexisting amebic colitis or infestation.

(e) *Intestinal Extracts*:—Haskell and Friedman treated 27 patients in whom the etiology was considered to be a lack of an intrinsic factor normally present in bowel mucosa. Fifty to 100 grams of extract of hog's intestine was given daily in divided doses as a powder or granules. Twenty-four cases were improved, but sustained administration is necessary for relapse resulted when the extract was withdrawn, but subsequently remitted upon resumption of the therapy.

(f) *Rectal Installations*:—Many substances have been used in an effort to treat the disease locally by means of injection through the anus, but it is very doubtful whether they produce any good results whatever. Indeed they may prove dangerous in some cases. Such therapy should probably be dispensed with completely as it already has been by the majority of men in this field. It is conceivable that microorganisms found in the dome of the rectum and sigmoid may be carried higher into the colon.

(g) *Intestinal Insufflation of Oxygen*:—Felsen was largely responsible for the intracolonic use of oxygen, but he later found that similar results could be obtained by inhalation of the oxygen. The good results achieved are undoubtedly due to the successful combating of any existing anoxemia by the oxygen. It is in no way curative and if used by unskilled persons it is capable of causing great damage to the diseased bowel.

(h) *Transintestinal Flushes*:—Flushes of hypertonic saline put into the duodenum by way of the duodenal tube have produced improvement in many cases in the hands of the senior author, these consisting of 9 grams of NaCl C.P. and 9 grams of $NaSO_4$ C.P. in one liter of sterile water and permitted to flow slowly into the duodenum. In fulminating cases these have been found helpful in overcoming antiperistalsis, lessening diarrhea and flushing the bowel of bacteria.

III. *Treatment of Chronic Invalidism*:—

Medically treated cases of ulcerative colitis which do not respond satisfactorily to treatment must accept their disability, invalidism or even death unless they are willing to submit themselves to surgery. In such cases the physician must use any and all of the above types of therapy in an effort to bring relief to a seriously ill patient. Such cases and their relatives will tax his ingenuity and his patience, and the handling of an intractable case is a very real test of a physician's devotion to his high calling.

IV. *Some Statistics of the Results of Medical Treatment*:—

Kiefer-Lahey Clinic: 327 cases—46 per cent satisfactory; 54 per cent unsatisfactory; ⅔ of the mild cases controlled medically; ⅓ of the severe cases controlled medically.

Machella and Miller—University of Pennsylvania: 3,639 medically treated cases were followed for from 1 to 10 years. 8 per cent were relieved for an extended period; 46 per cent were unimproved and 5 per cent died; 41 per cent showed some signs of improvement but were more or less incapacitated and developed recurrences. Of the 46 per cent unimproved—a total of 1,674 cases—638 submitted to ileostomy. Of these, 34 per cent died; 34 per cent were benefited and 32 per cent had no significant relief. One hundred eighty-four finally came to colectomy. Of these, 27 per cent died, 54 per cent were cured, and 19 per cent were classed as "improved" or "unimproved".

Surgical Treatment

The great stumbling block to adequate and successful surgery in ulcerative colitis is that the surgeon rarely if ever receives the patient in the proper physical

condition for the serious surgery which the adequate surgical treatment of this disease demands. Internists are loath to resort to surgery, always hoping for a remission, which, strange to relate, sometimes does occur even at the ninth hour. The patient dreads ileostomy with what he feels to be its drawbacks, and so will not consent to surgery in most cases until face to face with the inevitable.

This condition can be corrected somewhat by a better understanding of the surgeon's problem and the indications for operation on the part of the clinician, and an explanation of what may be accomplished by adequate and competent surgery on the part of the patient.

Such being the case, and being internists ourselves, we offer the following brief discussion of the surgical phases of this condition, and refer the reader to the writings of surgeons for a more adequate and detailed coverage.

I. *Indications for Surgery*:—

1. *Chronic Invalidism,* in a case not responding to adequate medical therapy properly carried out calls for surgery. Such intractable cases must be carefully individualized, and no absolute set of criteria can be laid down as indications for surgery in such cases.

The transition from the mild case over to the intractable one may be recognized by such things as hyperpyrexia, tachycardia, toxemia, disorientation, hepatic dysfunction, increase in the sedimentation rate, and a decrease in the blood cholesterol, marked increase of diarrhea with more and more muco-pus and macroscopic blood. Clearly such cases are not fixed subjects for surgery either, and must be put into a better status before surgery can even be contemplated. Note reference to transintestinal flushes with hypertonic salines.

2. *Anorectal Complications.*

3. *Polypoid Hyperplasia of the Colon*:—This is not accepted as an indication for surgery by all authors since the mortality for colon surgery in this type of case still exceeds the risk of malignancy. Operation, however, is imperative if biopsy specimens reveal malignant changes to be existent.

4. *Carcinoma of the Colon.*

5. *Stricture Causing Obstruction.*

6. *Acute or Subacute Perforation.*

7. *Abscess and/or fistula,* including rectovaginal fistula.

8. *Massive Hemorrhage* (rare).

9. *Postoperative Complications* in a case previously operated—rectal stricture, perforation, recurrence, etc.

10. Cases where it is believed that the colon is acting as a *Focus of Infection,* causing such conditions as Arthritis, Hepatic Dysfunction, etc. (rare).

II. *Types of Operation*:—

1. *Ileostomy.* In the very beginning of the discussion of ileostomy, let us say that it does *not* cure the disease, although it may, and sometimes does, cure the patient.

It should not be performed in this di ase except as a preliminary measure for colectomy. It is often followed by relapse if taken down. Ileostomy should never be done in fulminating cases as it produces disastrous results.

Many writers upon this subject and among them Crohn, feel that it is a poor type of operation, especially for young women of marriageable age, but many others, including Lahey, refute this vigorously and can both quote and present cases with a permanent ileostomy (after total colectomy) who miss nothing of the joys of life.

Paulson feels that there are cases which will permit closure of the ileostomy and gives the following criteria for attempting it:

Absence of occult blood in the stools
No stricture
By sigmoidoscopy:
No gross blood
No visible ulceration
No pus
No edema
No friability of the mucosa

He feels that the x-ray appearance may be disregarded in such cases, and that the duration of the disease is no index of its severity.

One of us (H. M. E.) has noted the good results obtained by a double barrelled ileostomy. Twelve selected cases had an open ileostomy for two years before the openings were closed. These were subjected to an x-ray survey before closure, by a barium enema injected through the lower opening and a sigmoidoscopic examination, cultures of feces from the upper os, etc. After five years all were in good health when last seen.

2. *Colectomy*:—This is the operation of choice in this disease in favorable cases following ileostomy by an interval of four months—always depending upon the condition of the individual patient. The question of whether to perform colectomy with or without anastomosis is beyond our sphere and we refer interested readers to the competent surgical authorities.

3. *Decostomy, Appendicostomy, Tube Ileostomy* are unsatisfactory either for irrigating or for healing, and are no longer performed where modern surgical enlightenment holds sway.

4. *Vagectomy*:—Fansler and Frykman report 19 cases of vagectomy with definite improvement or an entirely asymptomatic state in 73 per cent. These authors believe that properly selected cases will always improve following this operation. On anatomical grounds it is difficult to rationalize vagectomy. Pelvic parasympathectomy might conceivably bear fruit, but the vagus does not transmit impulses beyond the splenic flexure of the colon, if indeed that far. Time must pass to permit further evaluation of this method.

III. *Some Statistics of the Results of Surgical Treatment*:—

Bargen, et al:—One hundred eighty-five ileostomies were performed on 5.5 per cent of their cases of ulcerative colitis; 55 died before 6 months, and 26 died

shortly after 6 months, making a 43 per cent mortality. Thirty-seven were improved, while 67 had either complications or progression of the disease. Of these, 30 underwent subsequent colectomies with 11 deaths.

Cave and Thompson report a mortality of 23 per cent in 42 cases following ileostomy alone.

Garlock reported a mortality of 13.3 per cent following ileostomy alone, while *Cattell* in 83 ileostomies had a mortality of 14.5 per cent.

Thus we see that surgical mortality is still prohibitive. However, it continues to improve daily in the hands of the better surgeons in the better equipped hospitals.

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SIGMOIDOSCOPY

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This subject has been of special interest to me for nearly fifty years. The sigmoidoscope which was first devised by Howard Kelly, has undergone many improvements and modifications. I have employed Tuttle's modification of Strauss' instrument. I have had similar tubes made from ⅜ inch to ¾ inch in calibre and from 8 to 12 inches in length**, also tubes constructed of hard rubber for the employment of diathermy. The use of air insufflation to facilitate introduction of the tube is a dangerous procedure as I have known of several cases of perforation of the gut to occur.

All cathartics and water enemas should be avoided. The mineral oil retention enema (Oz. IV) the evening prior to sigmoidoscopy is of great value, but the first employment of the tube should be done without any preparation. Long cotton swabs are useful in clearing fecal matter as the tube advances.

The position of the patient is very important. He should assume the *knee-chest posture* on a flat table, the hips elevated, the shoulders low, with head turned to one side, and the spine in a relaxed concave position with the knees somewhat separated. In all rectal diseases the anal canal is very sensitive; above this no sensory nerve fibres are present in the mucosa of the colon. I employ a glass medicine dropper half filled with a 10 per cent cocaine solution, injected in the anal canal, and allow the patient to lie down for five to ten minutes before the tube is introduced. The left index finger, well oiled, explores the canal and now the tube is pushed up under the direct guidance of the eye of the operator, the field being illuminated by the protected light at the end of the tube. Should contractions occur the cotton applicator is dipped in a saturated solution of magnesium sulphate which dilates them and permits the passage of the tube to the rectosigmoid apparatus which was well described by W. J. Mayo. His anatomical studies led him to conclude that the rectosigmoid apparatus is a definite mechanism which retards the fecal current and prevents continuous progress of intestinal contents into the rectum. He found in a study of 100 cases of cancer of the rectum and rectosigmoid 63 per cent of the growths involved the rectosigmoid, 30 per cent the rectum only and 7 per cent the anal canal.

Cancer of this region, of course, requires expert surgery. However, the small polyps so frequently found are quickly and permanently destroyed by fulguration or the diathermy spark. This method is far superior to radium, which leaves a deep contractile scar; diathermy will penetrate one-half inch and cause no contraction. The adenomatous polyp may become carcinomatous and should always be removed.

While performing sigmoidoscopy the operator can also get a good view of the uterine cervix by vaginoscopy. My ⅜-inch tube can be introduced in virgins with

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the presence of a strong hymen. I have often destroyed benign polyps in the cervix by the diathermy spark.

The proctologist may often locate many lesions in the rectum that mean systemic disease, e.g., tuberculous ulcers, amebic dysentery, ulcerative colitis, and pus proctitis that forms a focus for a general infection. Amebic dysentery in its early stages is quickly cured by seven daily intravenous injections of emetine, Gr. I, for seven doses followed by the oral administration of .25 gm. doses of stovarsol, 1 tablet before each meal, for one week's time. Nearly every case of ulcerative colitis begins in the rectum and proceeds upwards into the colon. When diagnosed early it can be cured in 4 to 6 weeks' time by the *Mineral Oil retention enema.* Four ounces of the oil are given through a soft rubber 28-French urethral catheter placed four inches into the rectum at bedtime and allowed to remain in the colon all night. Mineral oil is not a culture medium and discourages the growth of all bacteria and is nonirritating. The instruction slip given to the patient is as follows: "The enema should be given at bed time. Plan to do it the very last thing so you do not have to get up again. Introduce the rubber tube, well oiled, into the rectum for a distance of three to four inches. Pour 8 tablespoonsful of oil into the funnel slowly. Lie on the back with the head low. When you pull the tube out have a soft cloth or towel handy and hold it over the rectum until the desire to pass the oil is over. It is necessary to retain the oil all night. Have a pan at the side of the bed in which to place the tube and funnel so it will not be necessary to get up."

Pus proctitis responds well to the daily insufflation of a dry powder consisting of equal parts of calomel and bismuth subcarbonate. It coats the mucosa well and is very adherent, traces can often be seen the following day.

When confronted with bleeding hemorrhoids one can often exclude lesions higher up by carefully selecting a mass of fecal matter at the 6 or 8-inch level, swab with the applicator and make an occult blood reaction with it. If negative you exclude any ulcerative lesion in the gastrointestinal tract.

EDITORIALS

The International Academy of Proctology

The need for a new Proctologic Association has long been apparent. For many years Proctology has existed on sufferance as a stepchild of general surgery. Aside from individual efforts, history reveals little evidence of research and practically no attempts to correlate clinical and experimental studies. Very few medical institutions offer any opportunity for the study of proctology, either in the pre- or postgraduate years. Opportunities for specialization in this field are thus limited. In addition the standards for the practice of proctology have never been sufficiently high. No examining board had been established and proctologists found it necessary to qualify in general surgery before being certified in the subspecialty of proctology.

The formation of the International Academy of Proctology on June 9th, 1948 was indeed an historic event. The purposes of the Academy are to unite in one Association physicians who are engaged in the specialty of proctology, or its allied fields, and to advance the practice and study of this branch of medicine through instruction, research, scientific meetings and the publication of a Journal containing, not only abstracts of current literature, but also original authoritative papers on proctology and related fields.

As a direct result of these objectives, and literature advocating the further development of the specialty, proctologists were stirred to action. Membership in the Academy, which is open to all physicians whose interests lie in the field (but whose practice is not necessarily limited to proctology) has been growing steadily. Leaders in general surgery, proctology, and gastroenterology throughout the world are now numbered amongst its Fellows and Honorary Fellows.

The American Board of Proctology which had been incorporated in 1935 and remained dormant throughout these years was reactivated. At a recent meeting of the Council on Medical Specialties, a vote to approve the American Board of Proctology was forthcoming. Thus this Board became the 18th Examining Board in the specialties to be approved by the council, and it is anticipated that the International Academy of Proctology will obtain representation on the board.

Since the Academy was formed we have held one scientific session in June, 1949, in conjunction with the American Medical Association meeting in Atlantic City, at which time the organizational meeting was held and officers elected. These include: President, Dr. Earl J. Halligan, Jersey City, N. J.; President-elect, Dr. Caesar Portes, Chicago, Ill.; First Vice-President, Dr. H. A. Springer, Cincinnati, Ohio; Second Vice-President, Dr. Edgar M. Scott, Jr., Birmingham, Ala.; Third Vice-President, Dr. Norman L. Albert, Johnson City, Ill.; Secretary, Dr. Alfred J. Cantor, Flushing, N. Y. and Treasurer, Dr. William Lieberman, Brooklyn, N. Y. Additional members of the Board of Trustees include: Dr. Francis S. Adams, Pueblo, Colo.; Dr. Carroll J. Bellis, Long Beach, Calif.; Dr. Donald C. Collins, Hollywood, Calif.; Dr. Harry A. Gussin, Chicago, Ill.; Dr. Raymond S. Johnston, Kearny, Nebr.; Dr. Kenneth W. Kressler, Easton, Pa.; Dr. Paul Lahvis,

Gowanda, N. Y.; Dr. William W. Meissner, Buffalo, N. Y. and Dr. Evan C. Reese, Stroudsburg, Pa.

Following the business portion of the meeting, the first scientific session of the Academy, attended by a large group, listened to the presentation of several outstanding papers, some of which appear in this issue of THE AMERICAN JOURNAL OF PROCTOLOGY, and others which will be published in later issues.

Our second annual convention will again be held in conjunction with the meeting of the American Medical Association in San Francisco. We are planning to meet at the Hotel Bellevue on June 23, 24, 1950. Additional details concerning this forthcoming meeting can be found elsewhere in this publication.

The appearance of THE AMERICAN JOURNAL OF PROCTOLOGY is further evidence of the rapid achievement of our Academy's objectives.

The International Academy of Proctology has thus already demonstrated its spark-plug ability in American and World Medicine. It will continue to do so for the advancement of the specialty of proctology.

EARL J. HALLIGAN,
President

THE AMERICAN JOURNAL OF PROCTOLOGY

The achievement of the objectives of the International Academy of Proctology requires an official publication which will disseminate information to the specialists in proctology as well as to the general surgeon and general practitioner who are confronted with proctologic problems in their daily practice. With this purpose in mind we present the first issue of THE AMERICAN JOURNAL OF PROCTOLOGY, official publication of the International Academy of Proctology.

THE AMERICAN JOURNAL OF PROCTOLOGY is a symbol of progress in this field of medicine and is a dedication to its greater growth. It will publish the complete proceedings of the Annual Scientific Sessions of the Academy as well as original articles on proctology and allied fields. Our pages will be open to all who have worthwhile material to present whether or not they are members of the Academy.

An abstract department under the able editorship of Dr. William Lieberman will present comprehensive abstracts of current literature which will bring to the fingertips of the busy practitioner concise and up-to-date information of advances in the field.

News items of interest to proctologists will be published as the occasion warrants with a view towards making the Journal as informative as possible.

As is so often the case in specialty publications, the income from subscriptions is insufficient to cover the cost of publication. For this reason we must rely upon the good will of those advertisers who have products in our field. We want to take this opportunity to thank those advertisers who appear in this, our first issue, for their foresight in taking space and for their valuable support. We trust that in the not too distant future other advertisers will have their products represented in our pages.

We pledge THE AMERICAN JOURNAL OF PROCTOLOGY to present the most progressive thoughts of the day. As the first authoritative journal in Proctology we will make every effort to develop and advance our specialty. ALFRED J. CANTOR, *Editor*

NEWS NOTE

THE SECOND ANNUAL CONVENTION OF THE INTERNATIONAL ACADEMY OF PROCTOLOGY

The Second Annual Convention of the International Academy of Proctology will be held at the Hotel Bellevue in San Francisco on Friday and Saturday, June 23, 24, 1950 immediately preceding the meeting of the American Medical Association.

Those interested in attending this meeting are urged to obtain rooms by writing to the A.M.A. housing bureau in San Francisco stating that they plan to attend the meeting of the International Academy of Proctology.

Detailed information concerning the program of the scientific sessions to be presented will appear in the June 1950 issue of THE AMERICAN JOURNAL OF PROCTOLOGY.

Members of the Academy, interested in presenting papers at the scientific sessions, are urged to return immediately to the Program Committee at 43-55 Kissena Blvd., Flushing, N. Y., the application form which they recently received in the mail.

ABSTRACTS

CARCINOMA OF THE RECTUM AND COLON—DIAGNOSIS AND TREATMENT. D. L. C. Bingham. J. Internat. Coll. Surg. 12:76-488, (July-August), 1949.

Malignant neoplasms of the colon and rectum cause 17 per cent of all cancer deaths. Seventy-five per cent of malignant neoplasms of the large bowel arise in the rectum and sigmoid colon, an area accessible to the palpating finger or the sigmoidoscope. More males are affected than females, and the most common decade is 55-65. Adenomata, single or multiple, in any portion of the colon should always be regarded as premalignant and be extirpated. Fully developed carcinoma of the rectum are either columnar adenocarcinoma or squamous epithelioma. Malignant disease of the rectum and sigmoid colon should always be suspected whenever a patient over 20 years of age complains of: a recent change in bowel habit (constipation, diarrhea or the passage of a large amount of flatus from the bowel), bleeding from the bowel (especially with defecation), abdominal discomfort related to defecation, gradually developing abdominal distention, loss of weight and strength or progressive anemia (not otherwise explained), attacks of partial obstruction or sudden obstipation, or an abdominal mass.

A digital, proctoscopic and sigmoidoscopic examination should then be made. The patient should be prepared for operation, if necessary, by a high protein high carbohydrate diet of about 5,000 calories daily to correct malnutrition, blood transfusions (small and repeated), iron and liver concentrates, correction of water and electrolyte equilibria, Vitamin C (1,000 mg. daily), by checking the respiratory, cardiovascular and renal systems and the blood sugar and finally by sterilization of the colon with streptomycin, sulphathalidine, etc. Any carcinoma of the rectum less than 12 cm. from the anorectal line should have a radical abdominoperineal resection. Anterior (conservative) resection should only be performed for tumors of low malignancy situated high in the rectum, and, to preserve sphincteric continence the level of the anastomosis should not be lower than the level of the anterior peritoneal reflection. Untreated patients have an average of 14 months to live from the onset of symptoms, whereas the five year survival rate following radical abdominoperineal resection of the rectum is 40-50 per cent. HAROLD NEIFELD

SURGERY OF THE COLON WITH SPECIAL REFERENCE TO END-TO-END ANASTOMOSIS. Earl Drennen and S. A. Kahn. J. M. A. Alabama. 19:No. 6, (Dec.), 1949.

The authors have reviewed, very briefly, the various technics and procedures in surgery of the colon as devised over a period of some 200 years.

A series of 40 cases, all of them private patients, are reviewed. The open method of end-to-end anastomosis was employed. The preoperative preparation, operative technic, postoperative treatment, anesthetic employed are outlined. The mortality rate in this series was ten per cent, three of the patients having died from medical complications and only one from leakage and peritonitis.

No proximal vents to relieve distention prior to operation were performed; however, a few of the cases had been subjected to colostomies by other surgeons prior to the operation of end-to-end anastomosis.

The authors feel that where the anastomosis can be made without tension and when edges of the intestine have good circulation, this is the operation of choice. EDGAR SCOTT

THE SURGICAL MANAGEMENT OF CHRONIC ULCERATIVE COLITIS. Harry E. Bacon and George D. Vaughn. J. Internat. Coll. Surg. 12:320-322, (May-June), 1949.

Though treatment for chronic ulcerative colitis is essentially a medical problem, surgical intervention is indicated for patients who do not respond and for those who develop complications.

All patients are placed on a rigid medical regime of individualized diet, adequate vitamins, transfusions of blood and plasma with small amounts of regular frequent parenteral administrations of protein derivatives, and sulfathalidine alternating with neoprontosil. Amebicides, such as emetine, are frequently used even though no parasites were found in the stool or mucosal scrapings. If two or three severe remissions or exacerbations occurred, surgery is indicated. An ileostomy is established, and, if after a suitable period of time, persistent sepsis, extensive scarring of the bowel, fibrous stricture, pseudopolypoid and malignant degeneration or arthritic changes occur, colectomy of the right, transverse and left colon are performed. After that the rectum and lower sigmoid are resected as the final step. HAROLD NEIFELD

MEGACOLIC ARTIFICIAL ANUS IN PATHOLOGIC SEGMENT—HIRSCHSPRUNG'S DISEASE. Feridun Sevket Evrensel. J. Internat. Coll. Surg. 12:705-706, (Sept.-Oct.), 1949.

Two cases of Hirschsprung's disease in which a temporary artificial anus was formed in a segment of the megacolon itself are reported. Then, after the patients had gained weight and their general conditions had improved, a radical colectomy including the fistulized part followed by the necessary anastomosis, was performed. HAROLD NEIFELD

PRIMARY RESECTION AND ASEPTIC ANASTOMOSIS FOR LESIONS OF THE COLON. A. B. Roffland, Wm. J. Michaels, Jr. Am. J. Surg. 78:458-465, (Oct.), 1949.

Colon resection results in establishing immediate continuity or delayed anastomosis, as in the Mikulicz procedure or some modification of it. Primary aseptic anastomosis is becoming more popular. This is due to many factors such as Wangensteen and Miller-Abbott tubes, antibiotics, colon antiseptics and increasing familiarity with the procedure.

Preoperative preparation consists of: 1. General considerations. 2. Management of unobstructed case. 3. Management of obstructed case.

General considerations pertain to chemical imbalances, vitamin deficiencies, anemias, hyproproteinemias, etc.

Unobstructed cases were prepared with high caloric, high vitamin, high protein, low residue diet. The colon was prepared with daily enemas, saline catharsis and sulfasuxidine. Obstructions of the ascending colon were decompressed where possible with Miller-Abbott tube and later low enemas. Where obstruction was not relieved after trial, ileotransverse colostomy was the procedure of choice. Then usual preparation was followed by a second stage resection.

In transverse or descending obstruction, authors preferred cecostomy using large bore tube and Lockhart-Mummery technic. After 48 hours the cecostomy tube was irrigated daily. When adequately decompressed, definitive surgery was done.

The majority of resections were done for carcinoma and majority of lesions for which aseptic anastomosis was done were proximal to the sigmoid. Authors are of the opinion the technic is not applicable to most lesions of sigmoid, because of difficulty in applying clamps and of placing accurate sutures deep in the pelvis.

In sigmoid lesions, high enough for anterior resection but too low for use of their technic, they have used open anastomoses with good results.

There was no thrombophlebitis or recognized phlebothrombosis in the series.

Postoperative care includes the use of blood transfusions, oxygen, fluids, proteins, etc. Patients were encouraged to move frequently and to breath deeply. Intratracheal suction with soft rubber catheter was used where patients were unable to expectorate. Foot exercises were daily routine. Penicillin was used routinely. Intragastric or intraintestinal suction was used until patient passed flatus per rectum. Early ambulation was used.

Average stay in the hospital for uncomplicated case was 15.5 days. Complicated cases 34 days.

The authors conclude that with careful preparation of patient, aseptic primary resection of colon is adequate and safe procedure. LEON HIRSH

SIGMOIDOSCOPY AND BIOPSY. Robert Turell and Byron J. Garson. New York State J. Med. 50:89-92, (Jan. 1), 1950.

In addition to the accepted indications for sigmoidoscopy, it should be performed routinely in the examination of all individuals over forty years of age. It always detects lesions within the reach of the instrument and often indicates lesions above its reach by blood or abnormal excretions descending into the field of visualization. Since three of every four cancers of the rectum can be diagnosed definitely by its use, sigmoidoscopy should always precede anorectal operation. The use of the sigmoidoscope may prevent inexcusable surgery in latent or mild forms of ulcerative colitis, may reveal cancer of the rectum or cancer of the sigmoid colon and is necessary for obtaining specimens directly from lesions for bacteriologic and parasitic studies.

The patient is prepared for examination by an enema of 1,000-2,000 cc. of lukewarm water or normal saline given ten to twelve hours before and again repeated three to four hours before examination, but is omitted when diarrhea is present. No anesthetic is necessary. In those under four years of age morphine may be employed. Proctosigmoidoscopy is always preceded by a mono- or bidigital rectal examination.

Though obstruction which prevents the insertion of the instrument is the only contraindication to sigmoidoscopy; it should be discontinued for persistent angulations of the bowel, fecal accumulations, blood or other discharge, new growths or other objects obscuring the lumen, or the struggles of a nervous, uncooperative patient.

For biopsy, several good-sized pieces of tissue should be taken from the center, the periphery and the mucosa surrounding the base of the growth, and should include submucosal structures or the basement membrane in order to show the presence or absence of infiltration of the growth.

Infants and children, unlike adults, seldom have internal piles but more frequently present congenital malformations of the anorectal outlet. In them the rectum and sigmoid have many sharp angulations, and the bowel wall is very fragile. HAROLD NEIFELD

PLASTIC REPAIR FOR POSTOPERATIVE ANAL INCONTINENCE. R. Turell, J. B. Gordon and K. Davis. Am. J. Surg. 75:89, (July), 1948.

The application of the Bunnell type of tendon suture is successful in the plastic repair of the anal sphincter muscle. Incontinence may be produced when complete section without immediate suture of the external anal sphincter muscles occurs in any but the posterior commissure. The posterior fibrous extension of the external sphincter to the the coccyx brings about a splinting of the cut muscle ends and this prevents incontinence. Incontinence often follows retraction of the cut ends following obstetric procedures or surgery, as after improper fistulectomy. Incontinence may result from injudicious prolonged packing or tight packing of the wound following section of the sphincter incident to fistulectomy. LEON HIRSH

MODERN TRENDS IN COLONIC SURGERY. A. W. Allen, G. A. Donaldson and C. E. Welch. Surg. Clin. North America. 29:1421-1434, (Oct.), 1949.

Early diagnosis is imperative. The symptoms are change in bowel habit (most frequent), distress, discomfort or cramplike pains, blood in the stools and often palpation of an abdominal tumefaction by the patient.

Abdominal examination may reveal distention or tenderness, usually proximal to the tumor, increased peristaltic sounds by stethoscope and liver edge low and. in late cases, irregular from metastases.

Rectal palpation in the Sims position with the patient straining may bring lesions quite high in the rectosigmoid down against the examining finger, and bimanual examination in the lithotomy position permits palpation of sigmoid tumors and occasionally a mass in the cecum. Sigmoidoscopy should be done in all cases. Only then should a scout film of the abdomen be made, and after this a barium enema, if necessary, to verify the site of the tumor.

In this series of cases the right colon including the cecum and hepatic flexure was the site in 23 per cent, the midtransverse colon in 8 per cent, the descending colon in 15 per cent and the sigmoid in 54 per cent.

In completely obstructive lesions, immediate proximal decompression with the Miller-Abbott or Harris tube (rarely successful) and colostomy is done; and blood transfusions and intravenous fluids given. In midtransverse and sigmoid lesions cecostomy is indicated, and completely obstructing tumors of the right colon, which are less common than those of the left, are best treated by preliminary ileotransverse colostomy. Sulfathalidine, 8 gm. daily for five days, is an effective drug.

A gas-oxygen-ether mixture in a closed machine is advocated as the anesthetic.

The obstructive resection of Rankin is the most universally practiced type of operation, and is always followed by end-to-end anastomosis.

One gm. of streptomycin is introduced into the peritoneal cavity.

Stay sutures of medium-sized stainless steel are best for primary closure.

One hundred thousand units of penicillin with .25 gm. streptomycin in the same syringe is given routinely for a few days every three hours.

Omit antibiotics for several days before discharging these patients to avoid serious delayed infection masked by these drugs. Blood lost is replaced during or immediately following the operation. Gastric suction is routine for 48 hours, allowing small amounts of water by mouth. Intravenous fluids to keep the patient hydrated are given for from 2 to 5 days, the average individual receiving 500 cc. saline and 2,000 cc. of 5 per cent glucose and water every 24 hours.

In patients under 65 years of age, 200 mg. Dicumarol is administered 24 hours after operation. If, on the third day, the prothrombin level is not satisfactory a second dose is given. In frail elderly individuals with marked arteriosclerosis prophylactic superficial femoral vein interruption is the safest method of preventing thrombosis and embolism. Patients are made ambulatory as soon as possible, usually by the third postoperative day. Sutures are often left in frail, undernourished and depleted patients for three weeks.

The patient should be in a state of well-being, with a well healed wound, and a normal clinical chart before leaving the hospital. Probably too much stress has been laid on the early return home following major surgical procedures. The operative mortality in this group has been greatly reduced